REPORT

FROM THE

SELECT COMMITTEE

ON

STEAM COMMUNICATION WITH INDIA;

TOGETHER WITH THE

MINUTES OF EVIDENCE,

APPENDIX AND INDEX.

Ordered, by The House of Commons, *to be Printed,*
15 *July* 1837.

Veneris, 9° die Junii, 1837.

Ordered; THAT a Select Committee be appointed to inquire into the best means of establishing a Communication by Steam with India, by way of the Red Sea.

Sabbati, 10° die Junii, 1837.

Committee appointed—

Sir John Hobhouse.
Lord William Bentinck.
Sir James Graham.
Mr. Robert Gordon.
Mr. Sidney Herbert.
Mr. Hutt.
Mr. Mullins.
Lord Viscount Sandon.
Mr. William Crawford.
Sir Charles Adam.
Sir Thomas Troubridge.
Mr. George Frederick Young.
Mr. Williams Wynn.
Mr. Bagshaw.
Mr. David Barclay.

Ordered, THAT the Committee have power to send for Persons, Papers and Records.

Ordered, THAT Five be the Quorum of the Committee.

Lunæ, 12° die Junii, 1837.

Ordered, THAT the Committee have power to adjourn from place to place.

Jovis, 15° die Julii, 1837.

Ordered, THAT the Committee have power to report the Minutes of Evidence taken before them, from time to time, to the House.

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REPORT.

THE SELECT COMMITTEE appointed to inquire into the best Means of establishing a Communication by Steam with *India* by way of the *Red Sea,* and to whom the several Petitions upon that subject were referred, and who were empowered to report their OPINION and the MINUTES OF THE EVIDENCE taken before them;— HAVE, pursuant to the Order of The House, examined the Matters to them referred, and have agreed to the following REPORT:

THE sudden termination of the Session having deprived Your Committee of the opportunity of that full investigation of the subject which it might otherwise have received, it is with some diffidence they present to The House the impressions which the valuable and important Evidences brought before them, and to which they beg leave to call the particular attention of The House, has produced upon their minds.

Your Committee have learned with much gratification that arrangements have been entered into between Her Majesty's Government and the East India Company for the establishment of a Monthly Communication by Steam from Suez to Bombay, and they hail with satisfaction the liberal spirit in which the Court of Directors have met the propositions of Her Majesty's Government for thus affording a direct intercourse with one portion of the Continent of India, and facilitating a communication for Letters with all the Presidencies.

That inasmuch as, in the opinion of the witnesses who have appeared before Your Committee, a direct communication by Steam from the Red Sea to Ceylon, Madras and Bengal, would be practicable at all seasons of the year by the employment of vessels of adequate tonnage and power; and as, under judicious arrangements, such extended establishment would appear to offer a prospect of an adequate return for the increased outlay, by the conveyance of Passengers, and of some valuable articles of Merchandize, which cannot be expected from the limited communication with Bombay alone; Your Committee feel bound to recommend a continued and zealous attention to the subject on the part of Her Majesty's Government and the East India Company.

But strongly as Your Committee are impressed with a sense of the advantages, Political, Commercial and Personal, which would arise from the more extended system of communication, they would earnestly deprecate any interruption of the valuable arrangements now in progress, with which it appears to them, from the Evidence adduced, to be perfectly compatible.

15 *July* 1837.

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MINUTES OF EVIDENCE.

Martis, 13° *die Junii*, 1837.

MEMBERS PRESENT.

Mr. Bagshaw.
Lord William Bentinck.
Mr. R. Gordon.
Sir James Graham.
Mr. D. Barclay.
Sir J. Hobhouse.
Mr. Mullins.
Lord Sandon.
Sir T. Troubridge.

LORD WILLIAM BENTINCK, IN THE CHAIR.

A Petition of several Bankers, Merchants, Manufacturers and others, from Birmingham, in favour of the proposed measure, read.

Mr. *Thomas Waghorn*, called in; and Examined:

Mr. *T. Waghorn*.

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1. *Chairman.*] WILL you hand in the statement which you have prepared upon this subject?—

[*The following Statement was then handed in, and read by the Witness.*]

"London, 71, Cornhill, 13 June 1837.

"To the Right Honourable Lord William Bentinck and the Members of the Steam Committee, in the Red Sea, appointed by Resolution of the House of Commons, 9th June 1837.

"My Lord and Gentlemen,

"My name and pursuits are doubtless known to each of you. I leave England to-morrow for Egypt by way of Marseilles, encharged by the East India Company and the India Board in that quarter for the establishment of steam communication between England and India by way of the Red Sea.

"Many writers, especially of late, have endeavoured to give the public information, by their prolific ideas, about this said steam intercourse; had they not done so, and thereby confused instead of throwing light on the subject, the writer would not have troubled your Lordship and the Committee with this letter at his departure. The Honourable Court of Directors of the East India Company and the India Board have already sent out orders to the Governor-general of India to place the Hugh Lindsay steam vessel between Suez and Mocha, to carry mails, passengers, &c., and the Atalanta and Berenice steamers between Mocha and Bombay, according to the original Resolution of the House of Commons of July 1834, for effecting steam intercourse with India by this route: besides which, much also is in progress by these authorities. That much is done, and more, much more, will be done by them in due course; and it will be for your Lordship and the Committee to carefully search out the cheapest and most efficient way of enlarging and improving this same steam intercourse on the most comprehensive scale, and carrying it to the three presidencies of India.

"My opinion is fixed; it is as follows: That so long as there is that perfect understanding between the English and French Governments, that the route by Marseilles is the quickest, cheapest, and consequently the best that can be devised; for nothing can be better than the present organized system for the transmission of India letters, &c. by the French steamers every ten days between Marseilles and Alexandria, and *vice versâ*; unless I might suggest that Government messengers should journey through France, to and from, on these vessels carrying the confidential despatches of the Government to and from Egypt; the private letters passing, as they now do, every day (Sundays excepted) through the channel of His Majesty's and the French post-offices. The passengers will all be

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delighted at this route, having no longer to fear crossing the Bay of Biscay in winter on their way to and from India. Having thus fixed the English line by way of France, during peace, I now go to the other side of the isthmus, and propose that two steam vessels should ply constantly between Suez and Mocha, having a third in ordinary at Mocha to take the place of either steamer in case of a break-down. These three steam vessels should be all of the same size, and about 550 tons burthen; the third one with only engineers in charge. Six more steamers, each of 850 tons, are required to perfect the communication from Mocha to all India, as follows: three of these steamers should go between Mocha and Calcutta, touching either way at Socotra for fuel when necessary, and anchoring at Trincomalee and Madras a certain number of hours for the delivery and receipt of everything going to or coming from any of the above places; another of these steamers in ordinary, with engineers only, should lay at anchor in one of the two bays of Socotra, to serve as a floating depôt, and when there is a break-down on the Calcutta line, this vessel can take the place of such break-down: two steamers should be given to the Bombay government, to be disposed of as it may think fit. My own opinion is, that these two vessels should not attempt the passage direct from Bombay to Mocha from the 15th of May to the 15th of September, during which four months wind and sea are dead against them; and should they attempt it, and in attempting it break down, they will have to sail all the way back to Bombay, and thus the Bombay communication will be interrupted until the other vessel takes the mails, &c. on a second time; and should she also fail, both the Bombay steamers will be knocked up in opposing the violence of the south-west monsoon. Should it be proposed to send the Bombay steamers to the south, to make their passage the same way as the Calcutta steamers, I say, in reply, that the mails, &c. had better be taken to Trincomalee during that short period, to be forwarded by the Calcutta steamers, thus avoiding the risk of sending two vessels over the same ground, in face of the south-west monsoon, during the prevalence of which the number of passengers from India is much less than at other periods of the year. In the other eight months, Bombay will possess advantages over Calcutta and Madras, owing to its proximity to Mocha, which will allow of a greater number of trips from and to that place than between it and Calcutta; for be it understood that the Bombay and Calcutta steamers should ply as often as possible between those places and Mocha, by which simple plan the Indian government will have only to calculate on taking and carrying the mails to and from Mocha, (instead of Suez,) where they will find mails and passengers from England always in waiting for them. If, however, Bombay could be brought to join the other line at Trincomalee, it would be much more economical in every point of view. I am aware of the difference of opinion on this point at Madras, Bombay and Calcutta, and have therefore to the best of my ability divided the six steamers of 850 tons burthen, giving two of them to Bombay, in case they are determined to pursue their own particular views: this, I think, is the most reasonable remedy which your Lordship and the Committee will discover, in endeavouring to find out a plan to please all parties and each presidency. Having thus as briefly, and at the same time as explicitly as is in my power, laid before you my own final views and opinions as to the number of steam vessels and their different stations, I now proceed to the next important details (leaving out all minor ones) bearing on the same subject.

"First, as to the depôts for fuel: Mocha should be the grand depôt between all India and Suez; Socotra should also be a depôt; and coals should be sent from England direct to those two places, as also to Bombay, Trincomalee and Calcutta, by way of the Cape of Good Hope; the coals for Suez and the Red Sea above Mocha should be conveyed to Alexandria, and there discharged from the vessel which brings them, into an iron flat boat built expressly for the Nile, and towed by a small steam tug to Cairo, whence they are conveyed in 48 hours on camels' backs to Suez, from which place they can be shipped to Jidda, &c., if wanted, by the native boats of the Red Sea. Conveyed as above, the coals will cost, from the pit's mouth to Suez, 3*l.* per ton, and this may in time be reduced to 2*l.* 10*s.* The delivery in tons weight, at the above-mentioned ports, of thousand tons of hand-picked dry Welsh coal should be contracted for by tender; of course including every item of expense incurred before their safe delivery as above.

"Many will object to sending coals to Calcutta, when there is plenty of Burdwan coal there. My answer to them is, that that coal is not economical to burn in steamers for long sea voyages, as it is 35 per cent. under quality of Welsh coal, and as it chokes up the flues, from its extra soot and smoke, in half the time that Welsh coal does: therefore Burdwan coal will only do for short stations and local purposes on the rivers and coasts of India.

"In writing the above, I am considering myself as charged with the execution of placing coals, mails, passengers, &c., from Alexandria to Suez, &c. At Mocha, Major Read, or some other officer, being military, should be forthwith established as the military resident of the Honourable East India Company, for many reasons. Again, Englishmen (being nautical men) should be fixed at each of the following places; viz., Alexandria, Cairo, Suez, Jidda and Cosseir, whose duty it would be to act as packet agents at those places. The admiral in India will be the best channel for making the necessary arrangements at Socotra, and he may probably station a small man-of-war there to promote and effect that object.

"My Lord, and Gentlemen of the Committee, be assured that every facility which the ruler of Egypt can afford will be given to this measure between Alexandria and Mocha, and

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and also that the writer will be alive to every interest that may arise progressively; and be further assured, that after the steam vessels are properly placed, this steam communication will maintain itself, except the original cost of steam vessels for the purpose from time to time. My Lord, and Gentlemen of the Committee, I am convinced that this great and most important object will experience at your hands all the care and research which it requires; I trust also, that in considering these my opinions on the subject, which has ever stood foremost in my mind, the 12 years of devotedness which I have spent in forwarding it will have some weight with you. I now again leave England in debt, and if anything nerves me on to pursue this matter with energy, it is the conviction that your Lordship and the Committee will not let my past and present labours in the cause go unheeded, but will hand them over to the House of Commons embodied in your resolutions. At the same time my mind is preyed upon by the consideration that I am suffered to go unrewarded by His Majesty's Government, whose duty it is instantly to remove that want of rank which, in an eastern country like Egypt, so strongly detracts from my better usefulness. My Lord, and Gentlemen of the Committee, I have the honour to remain, with undiminished devotedness to the India steam object,

" Your most humble servant,
" *Thomas Waghorn.*"

" *P.S.* My opinions in detail on minor matters connected with the foregoing have been fully detailed to Mr. Secretary Melvill, at the East India House. See also the reference sheet attached.

" *Thomas W.*"

Explanatory Plan.

" I HAVE all along, till latterly, thought that Galle would have been the best place for the final departure of steamers from the coast of India to the Red Sea; but after a most diligent search into that matter, I now find Trincomalee preferable, because it is the naval arsenal of His Majesty's fleet in India; consequently greater facilities can be afforded there than at Galle, at one half the expense: moreover, during peace, the vessels of war under the orders of the admiral on the East India station could be well employed, barring more urgent duties, in carrying mails, &c. On the arrival of the steamer at Trincomalee from Mocha, a vessel of war might sail on with the China mails to Singapore, whence they would be conveyed to Canton by any merchant vessel, and where letters would be found waiting, from Canton, to be conveyed by the vessel of war on its return to Trincomalee. By this means a much more speedy communication with China is provided than can otherwise be devised, until the merchants of China have themselves steam vessels to Trincomalee, of which I do not despair a few years hence. Again, another vessel of war should from time to time lay at Socotra, whose captain should be our authority there; he could yield great general assistance to the steam vessels there; and it would be a matter of deliberation for the directors of the East India Company, whether their own naval force in India should in time of peace be placed under the orders of the admiral on that station, for this and other purposes.

" I now beg to offer a few pointed remarks on the tracks which should be followed by steamers navigating between Mocha and the continent of India during the north-east and south-west monsoons.

" First, as to the north-east monsoon. Steamers of the size I have mentioned would go from Trincomalee to Mocha in that monsoon by wind and steam, without a stoppage, easily in eleven days; at Mocha they might stop three whole days, thoroughly cleaning their machinery and flues, and taking in coals for the return voyage; then they should return to Trincomalee, on their way to Calcutta, stopping at Socotra for coals on their passage.

" In the south-west monsoon, steamers should finally leave Trincomalee with only their foremast up, storm-fore-try-sail sheeted amidships set, and steam away southerly, within four points of the wind and sea, till they get to the line, where they will generally find light winds and calms, and sometimes a fair one; on arrival at the line, they should keep steaming due west, till they find Socotra bear from them N.N.W.; they should then get their mainmast up, and shape away their course directly for it, and they will often, by wind and steam, reach it on the 12th day. From Socotra they could sail all the way back to Calcutta, without steam, touching as before at Trincomalee and Madras. In the north-east monsoon, I expect to hear that the steamers have often sailed, and not steamed, from the continent of India to Socotra.

" These vessels should be capable of being changed from steamers to sailing vessels, and *vice versâ*, within six hours, according to circumstances; and if the admiral in India has the direction of them, they will be capable of the change in that short space of time, as each steamer should be fitted with a pawle wheel, so that on taking off the six lower paddle-boards, the iron part only would be pawled in the water, which would not impede the vessel in sailing more than one half-knot per hour. Let there be only a good understanding between the Governor-general and the admiral, and I will answer for it that the most economical as well as the most useful system for steam intercourse that can be devised will be adopted. Should a mercantile company ever be employed to carry on the communication betweed Suez and India, that should also be under the orders of the admiral.

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"Mauritius could receive mails, &c. by the dispatch of a vessel of war, until they have a steamer of their own there; and perhaps 1,000 soldiers, instead of 4,000, would then be deemed sufficient for all military purposes at that island. The saving of expense of 3,000 men thus effected would more than pay for the expense of keeping up two steam vessels instead of one, employed so usefully for all the best interests of that island.

"As soon as this same steam intercourse works well, many of the overgrown military depôts in India will also be pared down. And as, my Lord and Gentlemen, we grow into more sociality with our Indian subjects, there will be no occasion for fear, in a military point of view; for as we improve India, we shall wield the ploughshare instead of the sword.

"Gratitude from the people of India to happy England will predominate with them, instead of prejudice; and, my Lord, in after years, the then East India Company will have cause to exult in the establishment of this the greatest boon that ever was granted by one country to another. This, with other points, tending to make Egypt also a great nation, will flow out of the steam intercourse with India; indeed everything great and advantageous must flow from it to England; Egypt, India and other parts of the eastern world will be raised in the scale of nations, thereby strengthening the political and other influences of Great Britain. I have not yet said anything about the winds and weather in the Bay of Bengal; on that I have only to suggest, that the captains of steam vessels should go as near the Coromandel coast as possible, for smooth water; this applies to both monsoons; as it often blows half a gale in the centre of the bay, whilst it is quite light in-shore; thus, much wear and tear, as well as hazard, is saved to steam vessels."

2. The last time you were in Egypt you had an opportunity of seeing, I believe, a good deal of the Red Sea, had you not?—Yes.

3. What opportunity had you?—Repeatedly being on it.

4. Between what places?—I have been between Suez and Cosseir, carrying mails myself; and altogether I have been five times up and down the Red Sea.

5. To Mocha?—To Mocha.

6. What is the distance between Suez and Mocha, and Cosseir and Mocha, do you remember?—The distance between Mocha and Suez is 1,040 miles.

7. And Cosseir?—Cossier 260 miles less.

8. And what difficulties are there in going?—There are no difficulties whatever for steam navigation during every month of the year.

9. You are supposing in the Red Sea?—In the Red Sea.

10. Between Mocha and Suez?—Between Mocha and Suez there is no difficulty in steam navigation.

11. What is the prevailing wind?—The prevailing winds are north, during 11 months of the year.

12. And between Suez and Cosseir, for what length of time are the prevailing winds?—Nine months in the year between Suez and Jidda; in fact, northerly winds generally prevail in the Red Sea.

13. During any part of that period do those northerly winds blow with very great violence?—Occasionally they blow with violence, when the sun shines the hottest; it applies to that season of the year when the sun has most power; they get up as the sun rises, and go down as the sun goes down.

14. Will the steamers make against that?—They will make most way at night.

15. Can they make way in the day, when the wind blows with this particular violence?—It never blows with such violence as that a steam vessel cannot go against it.

16. Sir *John Hobhouse.*] When you speak of a steam vessel, you mean a steam vessel of a certain size?—I am speaking of a vessel built for the purpose, of 550 tons, or something of that size.

17. *Chairman.*] There are no gales in the Red Sea, are there?—There are gales occasionally, but very trifling, for a very short duration.

18. Is that north wind in the Red Sea equal to the south-west monsoon at its greatest height?—No, it is not half so bad, because the south-west monsoon blows strong for a week together, and the gales in the Red Sea are never known to blow above two days or three.

19. Sir *J. Graham.*] Is there much swell?—The sea soon goes up, and soon goes down; perhaps sooner than in any other part.

20. The north wind prevailing for 11 months in the year, what difference would there be during those 11 months in a passage between Suez and Mocha, with the wind favourable, and from Mocha to Suez?—In speaking of the 11 months, that 11 months was between Suez and Mocha, and then nine months between there and Jidda.

21. What would be the difference in the passage southward from Suez to

Mocha, as compared with the passage northward from Mocha to Suez; what would be the difference in point of time?—There would be a day and half difference on the average.

22. Not more?—Never more.

23. Lord *Sandon.*] There would be a greater consumption of fuel, of course?—Coming up, the steam vessels would often sail from Suez down to Jidda, and very likely to Mocha.

24. Sir *J. Graham.*] Both the shores are shoals, are they not?—It is an iron-bound coast, and a steam vessel should never approach the shore when she can avoid it.

25. There are shoals on both sides, are there not?—Yes.

26. The said channel is the only course for safety?—It is a fair good channel for the British navy.

27. What may be the width of that channel?—From 100 miles down to two miles; it is only two miles a short distance through the Straits of Juba.

28. Has that sea been accurately surveyed?—As accurately surveyed as it can be.

29. Are there any dangers in the mid-channel?—No dangers but what are known in the mid-channel.

30. Which is the last survey of the Red Sea?—The one just now made.

31. In the fair course between Suez and Mocha for a steam vessel are there many dangers, are they numerous?—The only part of the Red Sea that she could not go through at night with safety, is a small part called the Straits of Juba; and if it was not a dark night, she could go through there.

32. Excepting those straits that you have mentioned, the rest of the channel may be considered a channel from 80 to 100 miles wide, at deep water?—Yes.

33. And safe at night for steamers running?—And safe at night for steam vessels of any size.

34. Lord *Sandon.*] Has the Hugh Lindsay ever made a passage against the north wind?—Often.

35. Sir *J. Graham.*] And the difference has not been greater than what you have mentioned between the north and south voyage?—We find they are generally two days less going down to Mocha than up to Mocha.

36. Lord *Sandon.*] And you do not consider the Hugh Lindsay the best calculated steam vessel for that navigation, do you?—I think she is the worst steam vessel.

37. Sir *J. Graham.*] What is her horse power?—The Hugh Lindsay was built in 1829.

38. What is her horse power?—She has two 80-horse power.

39. And what is her draught when full of coal?—I should say it would be 15 feet of water; but they build vessels now, to carry the same burthen she carries, drawing only 10 feet.

40. Mr. *D. Barclay.*] And how many days is she going from Suez to Mocha?—About seven days; a good steamer should do it in five.

41. Mr. *Mullins.*] Are there no greater difficulties between Suez and Cosseir than between Cosseir and Mocha?—There are no greater difficulties, though it requires a little more care, as I said before, in going through the Straits of Juba.

42. Those are the only difficulties?—The only ones.

43. Sir *T. Troubridge.*] Is it a regular tide?—No; the current changes with the wind.

44. Sir *J. Graham.*] When you recommend two steamers for the actual duty between Mocha and Suez, and one in reserve, how frequently do you contemplate the voyage being made?—They will go, taking mails down from England, every 15 days.

45. The two in actual employment, and the one in reserve?—They will do it easily every 15 days.

46. Now in case of accidents occurring to any of those three steamers, to their machinery, where is the repair to be made?—If ever Trincomalee is established as the grand depôt for steam vessels, there should be a station at that place for steam vessels, and a steam vessel in the Red Sea that was partly worn out might take the mail on to Trincomalee, and return upon such occasions, carrying the mail, to take her place again.

47. Sir *John Hobhouse.*] From what place?—Suppose we say a steamer in the Red Sea wanted repair, if she comes up to Suez, we can send engineers to repair her

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her; but if she wants new boilers, we will take the mail all the way from Suez to Trincomalee, and she can have her new boilers, and then take the mail back instead of the proper steamer coming; they may change places.

48. Sir *J. Graham.*] If a steamer making the northern passage, and struggling against the northern wind, broke down on her voyage to Suez, where would the repair be made to the machinery?—At Mocha. At Mocha sometimes there would be three or four steam vessels together, and if a job wanted to be done to those three or four steam vessels, the engineer would do it himself.

49. Adopting your general plan, at how many places would you contemplate the necessity of having an establishment for the repair of steam-engine machinery?—At Trincomalee, and no other place.

50. Not at Mocha?—Not at Mocha, not at Suez; anything wanting to be done can be sent from Cosseir to be done; I should have them all look to Trincomalee, take a mail when likely to break down, and so have her repaired in time; it would be easy for the captain to write to the admiral, saying she wanted repair.

51. Mr. *Mullins.*] Have you ever considered whether it would be advisable to have an establishment at the Island of Camaran?—It is altogether useless; there is a bar which prevents ships of large draught going to it.

52. Are you aware of the opinions that have been given on that subject by the officer who commanded in the late survey?—I am aware, I believe, of the general opinions upon steam matters, for I read them all; but there is no facility at Camaran, and I cannot imagine why Camaran has been thought of; there is not a boat on the place, and hardly the means of living; the people live on the fish they catch; the place does not produce dates enough to maintain its own starving population: Mocha is a place containing 40,000 people; Mocha is the place for everything: you must take places where there are facilities.

53. Sir *J. Graham.*] Are there scientific engineers at Cairo?—There are; they repair the Pacha's steam machinery; he has got English engineers on board his steam vessels, and English engineers in charge of his factory. I could send Mr. Hill, and other men of science, at an hour's notice, from Cairo, to repair the vessels at Suez.

54. Though in the first instance the Pacha might give every facility for the establishment of this intercourse through his territories, if at any time he became hostile to it, and imposed a condition, he would be master of that communication, would he not?—I have heard him express himself that he would never oppose the English Government in anything.

55. But if he changed that intention, would he not be entire master of everything?—I do not think such a thing is ever likely to happen.

56. Any ruler of Egypt who changed his disposition might put a stop to it, might he not?—The Pacha clearly perceives it is to his interest to support this kind of thing; therefore he is the last man, or those who follow after him, who would be likely to throw any impediments in the way of this.

57. There would be a strong feeling both at Suez and Alexandria upon the subject?—In all the ports over Egypt.

58. The large expenses consequent upon travelling would recommend to the people of that country this channel of communication?—It has that effect already; there were 150 passengers passed through Egypt last year, who spent a great deal of money in horses, camels, and journeys to the desert, and in fact they were spending a great deal of money.

59. Have you reason to think they will be satisfied with that indirect advantage, and that a tribute will not be exacted?—There will be no tribute exacted; you are as free as you are here.

60. No port dues either at Alexandria or Suez?—No such thing is heard of as taxes there, except the grant tax of everything—the Pacha: but I pay no taxes; I have a house at Cairo; and there are no port dues at the entrance to the Red Sea, and no expenses of any sort.

61. No dues of any kind exacted at either port?—No; I do not think the Pacha would ever dream of putting on dues at either place.

62-3. Mr. *D. Barclay.*] You can have no security that dues will not be made?—I think, if a valuable cargo passes through Egypt, the Pacha will put a transit duty, the same as we do here through a turnpike-gate on a good made road; the Pacha, in putting this transit duty, insures it; he is to answer for it;

and he is answerable from the time it leaves the country to the time it gets there; and merchants would be glad to pay the transit duty.

64. Sir *James Graham.*] Is the communication between Alexandria and Suez perfectly secure?—With respect to the transit duty, I have two or three times spoken to the Pacha about it; and I have said, whenever your highness does tax it you must tax it low, and I think half per cent. will be enough.

65. Apart from the question of taxation by the government, is there security as relates to banditti or robbers?—I can find anything that is lost or mislaid, from Alexandria to Mocha, and I insure every passenger's luggage now who has luggage; there is no such thing as anything being lost or stolen in Egypt; because if they steal it, they must be found out; they do not require such articles for themselves, and they cannot dispose of them; therefore there is no inducement to steal; if a passenger was to drop his luggage, it would be brought to the English consul at Cairo; and if not brought, a messenger would be sent out by the Pacha, who would very soon recover it.

66. Is money valueless in Egypt?—Money is very valuable.

67. *Chairman.*] Are there no bands of robbers in that part at all?—No; wherever the Pacha's rule extends, robbery is put down.

68. Mr. *Mullins.*] Have you not been just stating, as well between Kennah and Cosseir as between Cairo and Suez?—Between all places under the Pacha's rule.

69. Both those places are of course under his rule?—I am not speaking of Syria.

70. Sir *James Graham.*] As to the security of Mocha, do your observations extend there?—That is under the Pacha's rule.

71. The imposts at Mocha are no greater than at Suez or Alexandria?—There are no duties at Mocha at all, except for the native vessels; the English flag exempts vessels from paying duty.

72. Might not that evasion lead to some new regulation of necessity?—I think not.

73. Is it not a complete sacrifice of all revenue, the extension of that immunity?—The principal things that those ships bring to the Red Sea are pilgrims, and those pilgrims that come not under the British flag pay the tax, and therefore that is the reason why those ships have changed their colours.

74. And if that immunity becomes general, and the use of the English flag universal, the tax on pilgrims will cease?—It is an illegal tax, the tax on pilgrims.

75. Sir *John Hobhouse.*] How do you mean illegal?—The pilgrims themselves bear the right of the Turkish authorities at Jidda to tax them; and it was only laid on two years ago, by the governor of Jidda, that is, the Pacha; there is nothing English that is taxed; I may go on to say, I believe, it is a religious tax for some repairs of the holy building.

76. *Chairman.*] What is the average width of the passage between the Straits of Juba and Suez?—At Suez, of course, the sea ends and comes to a point.

77. Between Suez and Juba, what is the average width of the passage?—It gradually gets larger till the channel comes to about 22 miles.

78. Is there any strong current down the Red Sea?—Sometimes there are trifling currents in the Red Sea, but no currents at any time that can be called strong ones.

79. Mr. *Mullins.*] Do you mean to assert that there is no greater difficulty in steaming in the upper part of the Red Sea, between Juba and Suez, than in the southern parts, in consequence of the force of the current?—No difficulty whatever in the Red Sea respecting currents.

80. I thought you said, this moment, that there were in the upper part?—I was asked the breadth of the passage, not the currents; I said they were trifling currents.

81. Does not the wind blow with greater force between Suez and the Straits of Juba and Cosseir, than between Cosseir and the southern parts of the Red Sea?—It does not blow with greater force; the very fact of the Hugh Lindsay having been nine times up and down the Red Sea without any physical difficulty, is enough of itself, without entering into any further inquiry about the Red Sea; my own opinion is, that Mocha is the best place that can be found in the Red Sea, and the only depôt required.

82. Lord *Sandon.*] Are you well acquainted with Camaran?—I am.

83. You have been there?—Yes, dozens of times; I am now going to illustrate why Camaran is not a proper place.

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84. *Chairman.*] I think you had better come and look at the chart?—I know the chart without looking at it; I know Camaran very well.

85. Sir *T. Troubridge.*] You have stated already that it is good for nothing?—Yes.

86. *Chairman.*] How many feet of water are there on the bar?—Fourteen feet; and I have known three of the Pacha's ships wind-bound for three weeks there, with an expedition on board; they could not get over that bar to Mocha; the sea on it made the water less, and when it was still there was water enough to go over; there is 14 feet of water, and that is sometimes reduced to 12.

87. Sir *T. Troubridge.*] Are those soundings in feet or fathoms?—Generally in fathoms; there are breakers close to it; there are some places in the Red Sea where I have known a vessel's stern to be 60 fathoms, and her bow on the shore.

88. Sir *J. Graham.*] Does that apply to the mid-channel?—No; I am speaking of the great depth of water; there is no place in the world where the water becomes so deep or a shoal so soon; it is like a stone wall.

89. Sir *T. Troubridge.*] Is there only one entrance to Camaran?—There are two entrances to Camaran.

90. Is not the second more easy than the other?—The second entrance may be more easy, but you will have to go a very tortuous round.

91. Sir *J. Graham.*] How often have you been there?—Eight or ten times.

92. And stayed there some time?—The reason why Camaran has been thought of, perhaps, is on account of the good water there is there.

93. How long have you ever stayed there at one time?—I have been there three or four days.

94. And have you always seen breakers on the bar?—Not always; the breakers get up with the sea.

95. Are you quite sure there is a bar?—There is a bar; the thing is illustrated by the Pacha's ships waiting for water to go over.

96. Have your ever sounded?—You do not require to sound in the Red Sea by daylight at all.

97. Have you ever sounded on the bar at Camaran?—I have never sounded on the bar, there was no occasion for it.

98. Then you do not know what the depth of water on the bar is?—I do know the depth of water by general report; and in fact, when I have been going over it, I have looked over the side and seen the depth; you can always see the depth.

99. Does the bar extend across the entrance entirely?—Completely across.

100. Mr. *Mullins.*] Do you mean to assert there is no channel, not even a narrow one?—There is a channel, but it is not more than 12 feet, if that can be called one.

101. Sir *T. Troubridge.*] What is the rise and fall of water?—Two feet; a vessel would have to wait, as the Pacha's ships did, till the water subsided to allow them to go over the bar.

102. Lord *Sandon.*] Is there good water at Mocha?—Not very good water.

103. Is there an abundance for the use of steam vessels?—An abundance for everything.

104. Mr. *Mullins.*] How many days does it take to go from Mocha to Socotra?—Three days, sometimes four.

105. Mr. *D. Barclay.*] Is not Socotra a very unhealthy place?—It is said so; it was so at one time; we have at times had unhealthy seasons in England, and you might as well say England was unhealthy, on account of the influenza which prevailed here a short time ago.

106. Sir *John Hobhouse.*] Then you do not mean to say that it is an unhealthy place?—No; as when a man-of-war has laid up there six weeks, they tell it is not; if our ships of war were to leave the East Indies because it was unhealthy, it would not be thought that they were acting very right, I imagine.

107. *Chairman.*] Respecting the traffic, have you ever heard an opinion expressed by the merchants in Egypt respecting the probable traffic that will grow up in consequence of the establishment of a regular steam communication with India?—It would be great indeed.

108. I am not asking what is your opinion, but have you heard what is their opinion upon the subject?—Yes; and they are all watching and expecting the thing at Mocha, and expect to derive very great advantage from steam intercourse.

109. Sir

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109. Sir *J. Graham.*] What is the traffic anticipated?—Everything, from the coast of Africa; all will come to Mocha, if it can find a market.

110. What do they expect to send to India, and what do they expect to receive from India?—Elephants' teeth, gold dust, gums; half the gums that are called Arabian gums are not so, they are African gums.

111. Is this what they will send to India?—It is.

112. I would ask, would they send, in the natural course of trade, elephants' teeth from Mocha to India?—They would send them to Egypt.

113. From Mocha to Suez; I was asking you what they would send from Mocha to India, and what they would withdraw from India to Mocha, in this anticipated trade?—I am not merchant enough to go into those points; I can only say that there would be a tremendous collection of African goods, which would find a ready market through Egypt.

114. Do they use opium at Mocha?—Scarcely any; all the Turkish opium will go on the steamers to India: I have already had letters from Paris, from persons asking me when they were to write to send their Cashmere shawls, and other articles of value, by that route.

115. By Mocha?—By that road, and so through Egypt, Marseilles can receive valuable articles from Bombay in 30 days; Cashmere shawls in large chests; worth 20,000 *l.*, or 30,000 *l.*, or 40,000 *l.*, in 30 days; who dreams that they would go round by the Cape of Good Hope.

116. *Chairman.*] Have you considered that articles from France would go?—Yes.

117. Is that the opinion of the merchants in Alexandria?—A great house at Paris have written to me to say, that they have written to their Bombay agents to send their Cashmere shawls by that route.

118. Will anything go from France by steamers?—Everything will go by steam vessels; all the printed papers of a valuable description, all books in which the gain of time is a profit, will go; even book packages from London will find their way through France by the diligence. The French steamers carry a pennant, and they take everything.

119. Sir *J. Graham.*] Will France be content that we should be the carriers from India to Alexandria, and to charge our profit upon so carrying?—The French will make their own charges through France; they make their own charges by their steam vessels, and it is a source of great profit to them. I question very much the expediency of allowing the French steam vessels to get all this great income which must arise from carrying from Marseilles to Egypt, and I think it will in due time be a strong point for the English Government to consider, whether they will not have their own steam vessels between Marseilles and Alexandria; there is no more difficulty in it than there would be in the French having their steam vessels at Bombay to carry their passengers to Calcutta.

120. Does France import direct from India?—Yes, great quantities of indigo, in their own ships.

121. Mr. *Bagshaw.*] You know, Mr. Waghorn, indigo goes exclusively from Calcutta to France?—I know it does.

122. Will you tell me what the rate of freight is by way of the Cape of Good Hope?—Now, the rate of freight for indigo is 7 *l.* a ton.

123. Now tell me what is the insurance by way of the Cape of Good Hope; two and a half per cent., is it not?—I do not know about insurances, I am not a mercantile man.

124. How much would the freight be from Calcutta by steamers up the Red Sea, then to be carried on camels across the desert to Cairo, then to Alexandria, and then trans-shipped, with the Pacha's transit duty, to Marseilles; combine all these, and tell me whether you think it at all probable that any indigo will go by that route?—I will explain to the Committee how it will, and I think that I shall carry conviction to all, and that you will be all satisfied it will; there are three months of the year when sailing vessels can go from Calcutta to Suez in 30 days, with ease.

125. Sir *J. Hobhouse.*] Which months are they?—From the 10th of October to the three following months; that is, in 30 days; they can go in five days down to Alexandria, and in ten days more they are in France; the gain of time upon that indigo will, in my opinion, cause it to have a command in the market when it is particularly high, and letters will go out sometimes directing things to be sent by that route; it would be matter of mercantile calculation.

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126. Mr. *D. Barclay.*] I ask you what the cost will be; can you calculate the cost of the conveyance of indigo from Calcutta; can you calculate the charge?—My opinion is, that although the charge would be a little more by the route of Egypt, still that would be more than compensated for by the gain of time; there are certain articles, coffee for instance, going a short distance, would command a greater value in the market than going a longer distance, because it arrives in a more marketable state, there is more essence in it.

127. Mr. *Bagshaw.*] The age of coffee constitutes its better quality, you know?—It does, that is the fact.

128. Sir *James Graham.*] When you say you expect, after the first commencement of the establishment of the packets, and the prime cost is incurred, that the profits on it will defray the annual charges, does that estimate rest on the supposition that indigo and other commodities will pass by this channel from France to India, or is your estimate formed with reference to passengers only, and without regard to goods?—My estimate is formed in this way; that everything that will pay by the cwt., instead of the ton, will go by steam vessels, which steam vessels, in that navigation, should set apart from 40 to 50 tons for cargo; vessels that carry mails in England set apart so much for carrying cargo, to make them pay, and we have only to follow the same course to make the Red Sea line pay.

129. What would you include in those articles, besides coffee, indigo and shawls?—Silks from China, China toys, pearls, opium, and many other valuable articles will go by this route; of this I am positive and sure.

130. Your estimate is formed on that basis?—My estimate is formed on allowing a certain portion of the ship, 30 or 40 tons, to be set apart for carrying valuable cargoes.

131. Mr. *Mullins.*] Would you suppose a vessel of the tonnage of 550 tons could reserve so large a portion as 40 tons for the purpose of carrying a cargo, looking to the larger quantity of coal she must take?—She could set apart 50 tons for the purpose.

132. Sir *J. Hobhouse.*] Has the Hugh Lindsay ever carried any cargo?—None.

133. Are you aware how many voyages the Hugh Lindsay has made in the Red Sea?—Eight or nine.

134. Mr. *Bagshaw.*] You were speaking in high terms of the French steamers in the Mediterranean, and of the route from Marseilles to Alexandria; I am afraid you did not tell the Committee the days of quarantine the passengers would be subject to?—There again, upon the French line, there is a better arrangement than upon our own; these French packets have quarantine officers, and by having quarantine officers they see that they do not break such and such regulations; they count their quarantine from the time they leave the port, we do not count it till we arrive.

135. Packets sailing from Alexandria to Marseilles in the usual period taken up with such a voyage, still the passengers would have to undergo a great length of quarantine at Marseilles?—They would have to perform the same quarantine that they do at Malta; but it is my opinion that before this day three months the quarantine at Marseilles will be less than it is now; I know from authority it is very likely to happen; and one of my principal inquiries at Paris, as I go along, will be, when it will happen.

136. But an English steam packet, that should sail from Alexandria to Falmouth, on arriving at Falmouth, the period for quarantine would have expired, and the passengers would not have to undergo any quarantine there I presume?—When Egypt becomes a healthy country, (which it will soon, from the excellent salutary laws of the Pacha, who is the first Mahometan ruler that has established such salutary laws. Vessels will then leave Egypt with clean bills of health, and there would be no necessity for quarantine at all; if there was a clean bill of health given to-morrow, there would be no quarantine.

137. Would you not recommend, in any establishment of steam communication between Egypt and India, that it should be done by one establishment throughout?—I know of no establishment capable of doing it the whole way; for instance, I went to Liverpool, five or six years ago, to inquire into that matter; they said we will do everything you like on this side, but in India that must be done by them; and I think you will not find that parties, unless they are trebly paid for it, will do the thing the whole way as it is wished; it would be an excellent arrangement, but I do not see how it is to be arrived at.

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138. Supposing Government were to undertake steam communication upon a very comprehensive plan between Great Britain and all the ports of India, should you not think it would be much better it should be undertaken direct from Falmouth than to commence from Suez?—I would beg to remark on the communication by way of France, and by way of Falmouth; in the first place, the mails leaving London the 1st of last month will arrive at Alexandria about the 26th, in 26 days, and they take two days to go to Falmouth; letters written upon the 6th in London will arrive at Alexandria two or three days before them.

139. That is, as far as letters are concerned; but you would not confine your communication to correspondence, I presume?—I think I would fix it at first for mail passengers, and a certain quantity of valuable cargo.

140. Now, in speaking of the navigation of the Red Sea, I think I understood you to say, that a vessel should go from Suez to Mocha every 15 days?—Yes.

141. What would be the use of that, seeing you are only to have a communication from Mocha to India monthly?—We have at this moment opportunities of writing to India every day in the week except Sundays; letters so written go to Marseilles, and every 10th day they go to Egypt; and I mean to send them on from Egypt every 10th day to Mocha, until steam is established for the purpose.

142. Sir *J. Hobhouse.*] You are talking, of course, of private letters?—Yes.

143. Lord *Sandon.*] What would be the advantage of reaching Mocha more frequently?—Because by this means letters would arrive in India in 43 days.

144. Mr. *Bagshaw.*] I beg to ask whether the mail of 1st July 1836, arrived in Bombay on the 12th August, how was that carried from Mocha?—I took that mail myself from Alexandria to Mocha; I arrived at Mocha at seven in the evening; a ship was sailing next morning at daylight, called the Discovery, which took it to Bombay; and thus this mail went by one of these chance occasions.

145. Sir *J. Graham.*] And those chance occasions are so frequent as to render it worth while to establish this mode of conveyance, in your opinion?—The chance communications are confined from May to the 25th August.

146. Mr. *Bagshaw.*] What became of the mails of last August, September, October and November, as far as you have heard?—The August mail, in the first instance, was detained one month at Malta, and eventually came on to Gibraltar, with the next month's mail, of September; those two mails were put on board the Honourable Company's vessel of war, the Euphrates, at Suez, which took them to Mocha, and the captain of that ship can best explain why he left them there.

147. The mails of those four months, I believe, were very numerous, and cost an immensity of money to the merchants; the mails of August, September, October and November?—It cannot be denied that there has been a great neglect at Mocha, in not having those mails taken on; this neglect is so evident to the parties concerned, that it is not likely ever to occur again.

148. Sir *J. Graham.*] There is now no resident agent at Mocha, I believe?—None but native agents; and if there had been a resident agent the mails would not have remained there; they would have hired boats. It is the want of authorities that is felt.

149. If I understand you, you propose that there should be nine steamers on the other side of the isthmus?—Seven employed.

150. And you propose that there should be resident agents?—Packet agents; so that, supposing there was anything wrong, the people would go to the mail or packet agent for information; you must have one man at the place to correspond with.

151. To give effect to that plan, is it not necessary there should be one central authority?—It is.

152. Is the naval authority in that quarter the natural authority, the admiral in command?—He has nothing whatever to do with the Red Sea; our ships of war never enter it, and have not done so since the last expedition to Mocha in 1823.

153. If other impediments were removed, do you see any obstacle to placing the whole of that establishment under the control and responsibility of the admiral at the East India station south of the isthmus?—I think it will be a saving to a very large amount, whenever it is done, and one of the most efficient things that could be done.

154. Must not the superintendents, both at Mocha and Socotra and Trincomalee,

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be naval men?—I would have a military man at Mocha, because the Turkish authorities think a great deal more of military authority than they do of naval authority; but at all the other places, except Mocha, I would have naval authority; for instance, the authority at Socotra is the captain of the man-of-war lying there from time to time.

155. You would look rather to a King's officer having a controlling power over this large establishment in the southern sea, than to an officer in the East India Company's service?—Yes; whether done by a mercantile company or not, it should be done under the orders of the Admiralty, because they possess resources that nobody else does.

156. Might not the stores for the use of the King's ships in that sea be bought at a smaller cost in aid of the steam establishment than similar stores could be withdrawn from any other quarter?—Decidedly.

157. Mr. *Bagshaw.*] Did you see the two steamers that went out to India?—Yes; there is one thing I would beg to remark upon to the Committee; there is this trifling alteration I would suggest in the present plan that is just put in progress by the East India Company, that instead of employing the Atalanta and Berenice both between Mocha and Bombay, one of them should ply between Calcutta and Mocha, and then you will arrive at practical facts, which you can carry into effect some 12 or 15 months hence; as to winds and weather, and things which are made now matters of doubt, for instance, the south-west monsoon, it will show what time a vessel will be in getting to Calcutta during the time that lasts.

158. Sir *J. Graham.*] On account of the monsoon, which, according to your evidence, will stop the communication for four months in the year between Mocha and Bombay, do I misunderstand you when I infer you incline to the opinion that the communication with Bombay should at all times take place through Trincomalee, rather than for eight months direct from Mocha to Bombay?—I have specially stated here it should go eight months direct through Bombay and Mocha, and the other four months it should go down to Calcutta alone through Trincomalee.

159. For eight months you would have it direct to M[illegible]—Yes.

160. And for the four months of the monsoon yo[illegible] have it indirect through Trincomalee?—Yes, to prevent the great wear and tear of the steam vessels.

161. Lord *Sandon.*] The difference in point of time would be about a couple of days, would it not, between Bombay and Mocha, as going direct and going round by Trincomalee?—The difference is this, that the Calcutta steamer would have started two days before from Calcutta with her mail for Trincomalee, and the Bombay steamer two days afterwards.

162. You recommend a circuitous route for certain months in the year; what would be the difference, between taking the circuitous route and saving the circuitous route, in point of time?—There would be no difference whatever, because at this time of the year you could not get from Bombay to Socotra against the wind and weather.

163. Sir *J. Graham.*] What is the difference in those months that you are able to go direct from Bombay to Mocha; how many days would it take to go direct, and how many days to go by the circuitous route; what are the eight months you would go from Bombay to Mocha direct?—From the 15th of September to the 15th of May I would go direct from Bombay to Mocha.

164. How many days would it take you?—That is according to the time of the year, sometimes it will take 12 days, and sometimes it will take 10 days.

165. Mr. *R. Gordon.*] Then it will average from 10 to 15 days?—It will average 12 days.

166. Supposing you continue the same route from the 15th of May to the 15th of September, during the monsoon, how many days will it take you going direct against the monsoon?—Probably 18.

167. Now during those months, instead of going direct against the monsoon, suppose you go round to Trincomalee, and so to Mocha, how many days will it take you?—About two days less than going to Bombay straight.

168. Mr. *Mullins.*] When you speak of 12 days, you do not take into consideration the power of the vessels, because different vessels must do it in a longer or a shorter time?—I have been in a steam vessel at sea in a gale of wind, where power was useless, because we should have gone down head first; in this case

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case it was in His Majesty's steam-ship Fire Fly, in a gale of wind in the Bay of Biscay.

169. What was the horse power?—This was three years ago, at which time she was the crack vessel in the navy for speed.

170. State the horse power?—Two seventy's.

171. And her tonnage?—About 600 tons, and this was an instance in which more steam would have been useless.

172. Supposing a vessel of 1,000 tons and 250-horse power were to be used, do you think such a vessel would prove unavailing against the south monsoon?—I mean to say that if she gets within 10 miles of her voyage, she must turn round and sail all the way back, because she has no port to go to.

173. Do you think it is likely she would fail?—I think, in a violent monsoon, it is almost certain.

174. *Chairman.*] How often have you been between India and the Red Sea?—I have been twice. I omitted to state, that as to steamers on the Red Sea, at Suez, there are pilgrims carried by them; there are persons who have ships of their own to carry pilgrims; there are sometimes enough to sink a vessel.

175. Mr. *Mullins.*] Which would you prefer, vessels of 1,000 tons and 250-horse power, or the vessels you have named, of 550 tons and a proportionate power?—It depends upon the navigation for which they are wanted; in some cases I would prefer a vessel of 500 tons.

176. In what cases?—Suppose I want to go 2,000 miles, or a long distance, by steam, I must have the largest vessel I can get.

177. Mr. *Bagshaw.*] Are you of opinion that no communication with India would answer, except combined with carrying passengers?—It would not.

178. Sir *John Hobhouse.*] You have made the passage you so recommend for steam vessels often, have you?—Being employed 12 years as a Bengal pilot enables me to speak confidently upon all nautical points in the statement which I have read.

179. Connected with that passage?—Connected with that passage, as stated in that written statement.

180. And you have no doubt, from your experience, of the practicability of such a passage being made by steamers, after the manner you have described?—I am certain they can do it with great ease.

181. Sir *James Graham.*] Is the communication there contained, as applicable to steam navigation, connected with your nautical experience in this sea?—Decidedly so.

182. Sir *John Hobhouse.*] You are now employed, are you not, by the East India Company and the King's Government, as superintendent, to assist Colonel Campbell, in Egypt, for the transmission of mails across Egypt?—I have had such an appointment a few hours.

183. Have you the least doubt you shall be able to carry into effect the objects of that appointment?—I am sure I shall.

184. You have no doubt of it?—I have no doubt of it.

185. In the performance of the duties which have been assigned to you, do you contemplate that occasionally it may be necessary to make use of sailing vessels instead of steam vessels?—Decidedly so; and the written statement alluded to tells you how the steamers are going to sail, sometimes 15 and sometimes 1,000 miles.

186. And by the employment of sailing vessels in that manner you have no doubt that the transmission of mails will be safely and regularly secured?—In six hours they may be made both sailing and steam vessels.

187. Are you acquainted with the tonnage and steam power of the two steam vessels that have been lately built by the East India Company, the Atalanta and Berenice?—I was in Egypt at the time they were built, and I have made various inquiries about them; I think, when they are made packets instead of armed steamers, they will be very useful.

188. Do you think it would be advisable that one of those vessels should be immediately directed by the Governor-general of India to make this pass which you have just talked of, in order to ascertain the practicability of it?—I do; and I will go to India for this purpose, and I will ask him to try during the south-west monsoon, in the height of it, with one vessel, to try the thing from Calcutta in the height of the monsoon, and I will go all the way to India to induce him to make this trial, and then you will have practical facts to go upon, because you

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might in a large arrangement be doing and undoing, and it is better to go steadily and surely to work than doing too much in the dark.

189. And you think then, from what you have heard of the power of each of those steam vessels, the Atalanta and the Berenice, when those two vessels shall be converted into packets, and not armed vessels, that the experiment can be made well with either of those vessels?—Decidedly; they are well adapted for the experiment. Many people, not masters of the subject, say that all the difficulty is in the Red Sea; now there is no such difficulty in the Red Sea; the Hugh Lindsay, tub as she is, goes up and down the Red Sea at all seasons of the year.

190. Mr. *D. Barclay.*] You say there have been interruptions during four months between Mocha and Bombay; would there be any interruption between Mocha and Calcutta?—None.

191. Mr. *Bagshaw.*] Have you not had a vote of thanks from the community of Calcutta, accompanied with a donation for your services in carrying the mails with such expedition over?—I have had a grant of 4,000 rupees from the Calcutta community.

192. And what from the Madras community?—The Calcutta community have given me 7,000 rupees; those gifts were made to me because all those parties knew I was in debt, and rendered so by my continued toils to effect this object, unaided by the East India Company and the Government up to two or three days ago.

193. Have not the merchants of London subscribed for the purchase of a piece of plate for a like object, to be given to you?—They have, which is very gratifying to me.

194. Mr. *Mullins.*] Do you know whether any wheel carriages of any description have ever passed between Cairo and Suez?—I know that the Pacha's wife and family have passed over in wheel carriages, and camels draw guns on carts over the deserts constantly.

Jovis, 15° *die Junii,* 1837.

MEMBERS PRESENT.

Sir C. Adam.	Mr. R. Gordon.
Mr. Bagshaw.	Sir J. Hobhouse, Bart.
Mr. D. Barclay.	Mr. Hutt.
Lord William Bentinck.	Mr. Mullins.
Mr. W. Crawford.	Mr. G. F. Young.
Sir James Graham, Bart.	

LORD WILLIAM BENTINCK, IN THE CHAIR.

The Right Hon. Sir *John Hobhouse*, Bart., a Member of the Committee, made the following Statement:

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THE first thing which was done to carry partially into effect the resolutions in the Report of the Select Committee of 1834, was to give directions to the Admiralty to complete the monthly communication of packets in the Mediterranean, by sending a steam-packet from Alexandria to Malta. That was in August 1834, almost immediately after the Committee had made their report; Lord Ellenborough, when President of the India Board, carried this arrangement into complete effect on February 7th, 1835, and when the present India Board was formed, the President of the Board extended the voyage of the Alexandria steamer by sending it on to Beyrout, and also to the mouths of the Orontes, in order to communicate with Colonel Chesney and the Euphrates expedition.

In order also to carry the same intentions of the Committee of 1834 into effect, the Court of Directors, in August 1834, sent a despatch to the Governor-general of India, desiring him to send the Hugh Lindsay steamer at stated periods to Suez. The Hugh Lindsay, in consequence of orders given by the Governor-general of India, has since that period made four voyages to Suez. I hold a paper in my hand, which mentions at what period those voyages were made, and in what time despatches were consequently conveyed backwards and forwards between England and India.

I should mention also, that in order to co-operate with the Euphrates expedition, and to expedite as much as possible the transmissions of mails between India and England, the Governor of Bombay, and subsequently the home authorities in England, established a dromedary post from Bagdad to Damascus, and from Damascus to Beyrout, on the coast of the Mediterranean.

The consequence of all these arrangements has been, that we have had the great satisfaction of forming a much more rapid communication with India than has ever been known since that great country has been in our possession; in confirmation of which fact, perhaps the Committee will permit me to read to them a despatch, dated on the 16th of September 1836, which the home authorities received from the government of Bombay; it is couched in these words: "We beg leave to offer to your honourable Court our congratulations on the rapidity with which your wishes have of late been conveyed to all parts of your Indian possessions. The three last overland mails have brought despatches from London to Bombay, in 58, 45 and 64 days; and those intended for Calcutta have been forwarded in 10 days. We have witnessed the energetic impulse this early intelligence has given to the mercantile interest, and the unbounded satisfaction it has diffused throughout all classes of the community. It is, indeed, undeniable, that a quick interchange of information is of the first advantage in commerce, and in the conduct of all public business, while it is equally time that the effect on the minds of those who serve the honourable Company long and faithfully in this distant land, is to deprive the painful feeling of separation from their homes and country of half its bitterness. We beg respectfully to press these reflections on the notice of your honourable Court, with our earnest prayer that you will ere long grant to India the much desired boon of frequent and regular communication with Europe, by the employment of a sufficient number of steam vessels for that purpose." This despatch, dated the 16th of September 1836, arrived here in the early part of this year.

Whilst the home authorities were thus attempting to carry into effect the resolutions of the Committee of 1834, they were at the same time engaged, but more particularly the India Board, to whom that duty was confided by Parliament, in carrying on the Euphrates expedition, to which I need not allude more specifically, because the terms on which this Committee is assembled, do not admit of any precise inquiry into that enterprise; but I ought to state, that one of the reasons why more decisive measures were not taken by the home authorities towards carrying into effect other portions of the resolutions of the Committee of 1834, was, that we considered that so long as the result of the Euphrates expedition was doubtful, and as the Euphrates expedition had been considered the first object to which the Government ought to apply itself, that we should not be justified in taking any decisive steps before we had seen the result of that experiment.

In the meantime, however, a company was formed for the purposes of steam communication with India. The President of the India Board had various communications with gentlemen representing that company; he saw them two or three times at the India Board. He had a correspondence with Major Head, who was then the provisional chairman of that company; also with Mr. Hutt, the Member for Hull, who was the permanent chairman of that company, and in consequence of communications with those parties, he at last called upon that company to give to His Majesty's Government, that is to say, to the India Board, a precise proposal with respect to the terms they could offer to the King's Government and to the India Company for a regular communication with India by steam boats.

Considerable delay occured; the President of the India Board found it extremely difficult to get any positive and precise information from the gentlemen to whom I have alluded. At last, however, a report was sent to the India Board, the title of which was this: "The Report of the Committee for promoting Steam Navigation with India." I hold that paper in my hand, and, if the Committee please, I will put it in, because it contains what, after the deliberation of many months, was thought by very competent persons to be the best offer that the parties concerned could afford to make—[*The same was delivered in, vide Appendix*

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pendix (A)].—Upon receiving this report, and giving to it every attention in his power, the President of the India Board communicated with three departments upon the subject; he sent a copy of this report to the Treaury; he sent another copy to the Admiralty, and he sent another copy to the Court of Directors, and at the same time he communicated personally with the Chancellor of the Exchequer, and recommended that the report should be, by the Admiralty or by the Lords of the Treasury, communicated to the Postmaster-general. This took place on the 7th of last December.

After some delay, a report was handed to the India Board by the Lords of the Treasury, prepared under the orders of Lord Lichfield, the Postmaster-general, by Colonel Maberley. I hold that report in my hand, and, if the Committee please, will put it in, together with the enclosures, of which I will only read the titles, to convey to the Committee a notion of their import. The first enclosure is "An Account of the Postage of Letters passing through Falmouth by the Mediterranean Packet." The next is, "A Return of the Number and Amount of Letters and Newspapers received by Private Ships from the Island of Ceylon, and the Three Presidencies of Bombay, Madras and Calcutta, in the three years ending 5th October 1834, 1835 and 1836." "A Return of the Number and Amount of Letters and Newspapers sent by Private Ships to the Island of Ceylon, and the Three Presidencies of Bombay, Madras and Calcutta, in the three years ending 5th October 1834, 1835 and 1836." "A Return of the Number of Bags and Boxes of Despatches sent to and from Ceylon, Bombay, Madras and Calcutta, by Private Ships, in the three years ending 5th October 1834, 1835 and 1836." "A Statement of the Number and Amount of Letters landed at the Ports in Ireland from the Presidencies in India; viz Madras, Bombay, Calcutta and Ceylon, for one year ended 5th January 1837." [*The Papers were delivered in, vide Appendix.*] The general result of Colonel Maberley's examination of the offer that was made by the company to which I have alluded was, that it would be highly unadvisable for the India Company, or for the King's Government, or for the Post-office, to accept the offer made by this company.

A similarly unfavourable, but not a detailed report, merely an opinion, was sent to the President of the India Board by the Lords of the Admiralty.

An equally unfavourable and decisive answer was sent to the President of the India Board by the Court of Directors.

In consequence, therefore, of those unfavourable reports, the President of the India Board thought it then his duty to communicate directly with the Court of Directors his own view upon the subject. The Court of Directors, through their secretary, Mr. Melville, addressed to Mr. Gordon, the secretary of the India Board, a letter, which I hold in my hand, and which I should wish to put in, dated the 1st of February 1837:

"Sir,—I have laid before the Court of Directors of the East India Company your letter, dated the 7th December last, requesting that the Board of Commissioners may be furnished with the Court's observations on the plan and proposal contained in a report, of which you inclose a copy, for the formation of a company to undertake the establishment of steam communication with India.

"In reply, I am commanded to state, that the Court, having maturely considered the subject, are of opinion, that in order to insure the efficiency and permanency of steam communication with India, it should be established and maintained by His Majesty's Government and the East India Company; and that on this ground, independently of the objections to conferring upon the projected company the right of levying postage, the proposition submitted in the report cannot be entertained; but while such is their opinion upon that proposition, they desire distinctly to state their readiness to concur in the establishment of a monthly steam communication with India by the way of the Red Sea, upon the principle which was recommended by the Committee of the House of Commons in 1834, and to which they have on former occasions referred, viz. an equal division of the expense between His Majesty's Government and the East India Company.

"The Court submit, that the expense, to be thus divided, should be the charge which might be actually incurred for the object to be effected, and as His Majesty's Government have already a packet establishment for other purposes between Falmouth and Malta, the conveyance of the India mails to and from

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Malta would not be attended with any charge to His Majesty's Government. The expense of the necessary establishment beyond that place is, therefore, all that would be incurred on account of India, and, consequently, all which the East India Company should be called upon to share.

"The Court being, however, anxious that the settlement of this question should be no longer delayed, are willing, as His Majesty's Government have extended the packet communication from Malta to Alexandria, to waive the claim which India might possess to a share in the postage which in such case would be received by His Majesty's Government to and from Bombay, instead of, as at present, to and from Alexandria.

"Should His Majesty's Government consent to this principle as a basis for future proceedings, the Court would be prepared to enter upon the necessary arrangements, in framing which it appears to them to be requisite that His Majesty's Government should issue such directions with respect to the mail from Alexandria and Malta for this country, as would obviate the inconvenience which has already resulted from the departure of the packet from Alexandria before the arrival there of the mail from India. (signed) "*L. Melville.*"

This is the letter to which I have before alluded, and which contained the first direct proposal made by the Court of Directors to the President of the India Board in writing. This letter was received on the 2d of February, and on the 3d of February the President of the India Board wrote to the Chancellor of the Exchequer a letter, which I will take the liberty of reading:

"Sir,—I have the honour to transmit to you, for your consideration, a copy of a letter which this Board has received from the Court of East India Directors relative to a speedy and regular communication between this country and India, by way of Malta, Alexandria and the Red Sea. My understanding of the proposal herein made to His Majesty's Government is, that the Court think they ought to pay no part of the expense of conveyance from England to Alexandria, but they are willing to divide, in equal shares, the expense to be incurred by transmitting the monthly mails between Alexandria and Bombay.

"They are willing, it appears, in consideration of such arrangement, to leave to the Government the whole profit to be derived from the postage of letters by this route, both to and from India.

"I cannot help thinking that the proposal thus made by the Court of Directors is exceedingly fair, and I should hope that the additional outlay might, in no very protracted an interval, be provided for by the postage, which the Court propose to abandon for the advantage of the public revenue. Begging your early attention to this very important subject,

"I have, &c.
(signed) "*John Hobhouse.*"

"To Right Honourable
The Chancellor of the Exchequer."

The President of the India Board did not receive any precise answer to this communication of the 3d of February until the 9th of March. The answer that was received at the India Board was as follows:

"Sir,—With reference to Sir John Hobhouse's letter, dated 3d ultimo, enclosing copy of one from the East India Company, relative to a speedy and regular communication with India, by the way of Malta, Alexandria and the Red Sea, I am commanded by the Lords Commissioners of His Majesty's Treasury to state to you, for the information of His Majesty's Commissioners for the Affairs of India, that my Lords concur with the President of the Board of Control in thinking that a speedy and certain communication with India is a matter of so much importance to the whole of the King's subjects, that it is fitting to assist in its attainment by some contribution from the public resources; and their Lordships are, therefore, willing to admit the principle stated in the correspondence before them, but they will require more precise and definite information before they can lay the case before Parliament; and, with this view, I am to request that you will move the Commissioners for the Affairs of India to put the proper authorities in communication with the Post-office department, in order that a more clear and precise plan and estimate may be submitted to this Board." I beg to direct the attention of the Committee to this last paragraph of the letter: "Their Lordships, of course,

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assume that the question reserved for their consideration will embrace the communication, by steam, with the three presidencies.

"To Robert Gordon, Esq." (signed) "*F. Baring.*"

On receiving this letter on the 9th of March, the President of the India Board wrote on the 10th to the Chairman and Deputy-chairman of the Court of Directors a letter, which I will also take the liberty to read to the Committee:

"Gentlemen,—I have the honour to enclose for your perusal a copy of a letter addressed to this Board by the Lords of the Treasury, in reference to the proposal made by the Court of Directors for establishing a regular and speedy communication to and from India.

"You will perceive that their Lordships request the Commissioners for the Affairs of India and the Court of Directors to communicate with the Post-office, in order to obtain an estimate of the probable expenses which may be incurred by the establishment of a line of packets for the required monthly conveyance of the Indian mails, either by the Red Sea or by the Persian Gulf; and I would thank you to inform me what officer of the India House it may be your wish to appoint for the performance of this duty. I have also to direct your attention to the concluding paragraph of their Lordship's letter, and to state that I entirely concur in the view therein expressed, as I am convinced that any plan which does not embrace a communication by steam packets with Madras and Calcutta, as well as with Bombay, will entirely fail to give public satisfaction, and to fulfil the just expectations of the people, both of England and India.

"To the Chairman, &c." (signed) "*John Hobhouse.*"

That letter was sent on the 10th of March.

On the 30th of March an answer, as follows, was addressed by the Chairman to the President:

"Sir,—I have had the honour to receive, and to lay before the Court of Directors of the East India Company, your letter, dated the 10th instant, with its enclosure; and I am requested to express the satisfaction of the Court at finding that their proposal, as submitted in the letter from the deputy-chairman and myself, dated the 1st ultimo, for establishing a communication from Alexandria to Bombay, by way of the Red Sea, at the joint expense, in equal shares, of His Majesty's Government and the Company, His Majesty's Government being entitled to all the postage to and from that presidency, upon letters sent by that route, is acceptable to the Lords of the Treasury. The Court are aware, that it will be necessary to promote, by every possible means, facility and quickness of communication between Bombay and Calcutta and Madras; and they have observed, by recent intelligence, that the government of India has adopted arrangements for the acceleration of the dauk, by which packets may be conveyed from Bombay to Calcutta in from eight to ten days, and to Madras in about seven days, and which the Court consider to be a much more rapid and certain, and unquestionably more economical mode of communication than a steam conveyance. The Court submit that the question, either of altering the India station for the steam-packets, or of establishing a branch communication by steam between Bombay and the other presidencies, should be reserved for consideration, after trial has been fairly made of the plan suggested in their former letter; but they are prepared to authorize the Bombay government, in the event of the difficulties on the line of the Red Sea in the months of June, July, August and September, being found insuperable, to take such measures, pending the determination of the home authorities upon the subject, for forwarding the packets to or from Bombay by the Persian Gulf, as may insure a regular monthly communication. In reference to the desire expressed by the Lords of the Treasury, that the proper authorities should be put in communication with the Post-office department, in view to a more clear and precise plan being submitted to their Lordships, the Court request me to state that they will instruct their secretary, who is also their financial officer, to confer with any officer who may be named by His Majesty's Government for the purpose of preparing an estimate of the expense, or of collecting any further information that may be thought necessary.

"Right Hon. Sir John Hobhouse, (signed) "*James Carnac.*"
&c. &c. &c."

On

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On receiving this letter on the 30th of March the President naturally entertained some doubts as to the course which it would be proper to pursue. He had several oral communications with the representatives of the Court of Directors, and from them was given to understand that any effort upon his part to insist at once upon the larger plan being carried into effect would most probably fail, and that by so insisting on an extended plan it was more than probable that no immediate step would be taken towards a steam communication with India, or towards any first experiment of importance. The President considered that by consenting to the modified plan he was in effect conforming to one of the alternatives that was proposed in the 5th resolution of the Committee of 1834 that resolution was as follows, "Resolved, That it is the opinion of this Committee that it be left to his Majesty's Government, in conjunction with the East India Company, to consider whether the communication should be in the first instance from Bombay or from Calcutta, or according to the combined view suggested by the Bengal Steam Committee." The Committee will perceive that in acceding to the modified proposal of the Court of Directors the President was adopting one of the plans recommended in this resolution. The President thought himself justified in postponing the larger scheme, and he accordingly wrote a letter, on the 3d of April, to the Chancellor of the Exchequer, in the following terms:

"Sir,—I beg to transmit to you a copy of a letter received at this Board from the Chairman of the East India Company relative to the speedy and regular conveyance of mails between England and India, and I have to remark, that although my own views of the question would induce me to prefer an immediate arrangement for communicatng not only with Bombay but with Madras and Calcutta by monthly steam packets, yet, in order to prevent delay in the commencement of so useful an enterprise, I consider it to be advisable to close with the proposal now made by the Court of Directors. I would therefore thank you to inform me (in case the Lords of His Majesty's Treasury should coincide with me in the above opinion) with what officer of the Post-office department you would wish the secretary of the India Company to be placed in communication, in order to make requisite arrangements for carrying into effect the proposed plan.

"I have, &c.,
(signed) "*J. Hobhouse.*"

"Right Honourable
The Chancellor of the Exchequer,
&c. &c. &c."

To that letter, dated the 3d of April, no positive answer was received until the 17th of April, but in the meantime the President had various communications, partly by letter, partly verbal, with all the departments, the Admiralty, the Treasury, and also with the Court of Directors. On the 17th of April, Mr. Gordon received from Mr. Francis Baring this letter:

"Sir,—With reference to the letter from Sir John Hobhouse of the 3d instant, inclosing one from the Chairman of the East India Company, relative to the conveyance of mails between England and India, I have it in command from the Lords Commissioners of His Majesty's Treasury to acquaint you, for the information of the Commissioners for the Affairs of India, that my Lords consider that the East India Company should be put into communication with the Postmaster-general and the Lords of the Admiralty on the above subject, and they will make the necessary communication with those departments accordingly.

"I am, &c.,
"*F. Baring.*"

"To Robert Gordon, Esq."

This letter was considered to be an acquiescence in the proposal, and accordingly the Court of Directors were requested to communicate with the Post-office, and to frame an estimate of the expense to be incurred by a monthly communication between Bombay and Suez, by four steamers of 200-horse power each. The estimate was framed and sent to the India Board, and I have been informed that the Post-office department entirely concur in the correctness of it; I hold that document in my hand.

Cost

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Cost of one steamer complete, 30,000*l.*

		£.	£.
Interest on capital sunk, at 4 per cent. per annum - - - -		1,200	
Insurance on capital sunk, at 5 per cent. per annum - - -		1,500	
Annual deterioration by wear and tear, reckoning duration of hull at 15 years, say 6⅔ per cent. on 17,000*l.* - - - -	£. 1,147		
Duration of engines at 10 years, and boilers (copper) at eight years, or for the remainder of the cost 13,000*l.*, say nine per cent. - - - - - - - - - - - - -	1,170		
		2,317	
Annual repairs, say 5 per cent. - - - - - - - - -		1,500	
			6,517
Establishment and victualling - - - - - - - - - - - - -			5,000
Coals, assuming three voyages per annum from Bombay to Suez, each voyage to occupy 40 days in steaming, and the consumption of coals to be 18 tons a day; in this view the quantity required will be, tons - - - - - - - - - - - -	2,160		
Allow for wastage, &c. about 20 per cent. - - - - -	440		
	2,600		
Expense of one-fourth of that quantity at Bombay, viz. 650 tons at 45*s.* per ton - - - - - - - - - - - - -		1,462	
Expense of three-fourths in the Red Sea, viz. 1,950 tons at 80*s.* per ton - - - - - - - - - - - - -		7,800	
Expense of transhipping coals, &c. - - - - - - -		1,221	
			10,483
			22,000
Or for four steamers per annum -		- £.	88,000

The following note is appended to the estimate: "In the foregoing view, it is assumed that the steamers are to be constructed at Bombay, where timber and other materials are stated to be reduced 50 per cent. compared with the prices of the year 1829, when the Hugh Lindsay was built;

That the hull, &c. will cost - - - - - - - - -	£. 17,000
And the engines, copper boilers and machinery - - - -	13,000
	£. 30,000

"It is also assumed that the value of the old copper boilers and other worn-out stores, will cover the freight of new engines, &c. out to Bombay." I beg leave to put this estimate in, which, as far as I understand, is considered to be rather over than under what the cost is likely to be.

Sir John Barrow was also requested to give an estimate of the expense of one steam-boat in the Mediterranean; he transmitted this paper:

"Spitfire, 553 tons, and engines of 70-horse power each:

	£.	s.	d.
Wages - - - - - - - - - - - - - - - - -	1,602	16	8
Victuals, including extra allowance of spirits while the steam is up - -	688	4	–
Coals for 12 trips, reckoning the time of steaming each trip to be 20 days, calculating that the consumption is at the rate of one ton in two hours, and at the last contract price for coals delivered at Malta and Alexandria,	4,624	–	–
TOTAL (exclusive of repairs) - - -	£. 6,915	–	8

"This calculation," Sir John Barrow says, "is made for one steamer going each month for one whole year, from Malta to Alexandria, Alexandria to Beyrout Beyrout to Scandaroon, return to Alexandria, and from Alexandria to Malta."

Upon receiving these estimates, the President communicated the result to the Chancellor of the Exchequer, and personally had several conversations with him upon the subject; the result of which was, that he sent to the President a private letter, stating his consent, and that the Lords of the Treasury might be considered as acquiescing in the arrangement.

The President communicated this to the Court of Directors, and on the 2d of June the following despatch was sent out to the Governor-general of India in Council. I read this despatch, because it in fact tells what has been done, very shortly, and gives the necessary orders to the authorities in India:

"1. We

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"1. We have the satisfaction to acquaint you, that we have concluded an arrangement with His Majesty's Government for the establishment of a monthly steam communication between Great Britain and India by way of the Red Sea; 2. His Majesty's Government undertake the transmission of the monthly mails between Great Britain and Alexandria, at the sole charge of the public; and we have undertaken the transmission of these mails between Alexandria and Bombay, upon condition that one-half of the expense which we may incur in the purchase, equipment, maintenance and navigation of steam vessels (including the value of any which we may already possess, and which may be applied to this purpose), or on any other account for the service, shall be repaid to us in London, at the termination of each year, we consenting to relinquish to His Majesty's Government the whole of the postage between London and Bombay; 3. It is our desire that this arrangement take effect forthwith, and with that view we shall direct the government of Bombay to send the Hugh Lindsay to Mocha for the purpose of her being regularly employed in conveying the mails between that place and Suez, and to dispatch the Atalanta and Berenice on alternate months to Mocha; 4. We are aware that a fourth steamer will ultimately be necessary, and we shall adopt measures for providing one; 5. We shall immediately contract for the purchase of a large quantity of coals for consignment to Bombay and to Mocha respectively; 6. A portion of those sent to Mocha may, if necessary, be ultimately conveyed to Suez, but we intend to try the plan of supplying that place with coals, *via* Alexandria."

This despatch has been sent to the Governor-general of India. A few days before it was determined to send out that despatch, it was thought proper to take into consideration a plan that had been suggested before to the India Board, for the transmission of the Government mails across France to Marseilles, by which plan it was concluded, upon premises which I believe are correct, that a saving, as the Committee have heard from the witness, Mr. Waghorn, of from four to six days, and perhaps a little more, might be made in the time employed on the whole conveyance.

The President communicated on this subject with the Foreign Office, submitting to Lord Palmerston certain papers drawn up by a gentleman very capable of judging on the subject, who had been for many years a resident at Malta, Mr. Calvert. Lord Palmerston favoured the President with his views on the subject, concurring generally in the expediency of such an arrangement, and consenting that either a Government messenger, or some person empowered to take the India mail, shall, once a month, that is to say, on the 6th of every month, leave England for Marseilles. I should state, at the same time, that his Lordship thinks it possible there may be some difficulties with respect to a general Indian mail in sealed bags traversing France, but that he is far from thinking that those difficulties may not be finally removed. I hold in my hand a table showing the organization of the packet service, and the postage of letters so transmitted by the French steamers in the Mediterranean, and the rate of passage per head; it is a translation from a French official document, and perhaps it might be useful for the information of the Committee. [*The same was delivered in, vide Appendix*].

Having mentioned that the Court of Directors had, during the interval to which I have alluded, built and sent out two steamers, perhaps it may be as well that I should put in a statement of the size, the horse-power, guns, &c., of the Company's two steamers, Atalanta and Berenice. [*The same was delivered in, vide Appendix*]. It will be some satisfaction to the Committee to know that these two steamers seem likely to answer their objects. The Berenice, in coming up channel, which she did on her way from Scotland, proceeded at the rate of eight knots an hour in the face of a strong breeze almost the whole of the way. And the Atalanta ran from Fernando Po to the Cape of Good Hope, which is 2,200 miles, in 13 days, without having her copper looked to.

These vessels are now gone out, and, in order to make some experiments of the larger plan of communication with the three presidencies by steam, the Governor-general has been instructed, not by a public despatch, but he has been recommended, to send one of the steamers, either the Atalanta or the Berenice, round from Calcutta to Madras, thence to Ceylon, and thence to Socotra and up the Red Sea to Suez; so that, at least by one trial, we may be able to ascertain practically what objections there may be to that route.

I think that I have detailed to the Committee pretty much what has been

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done by His Majesty's Government and by the Court of Directors, and I have only to say, in conclusion, that I consider that both the Court of Directors and the King's Government were justified in making the first experiment to Bombay. I need not tell gentlemen of the Committee, many of whom are so well acquainted with the subject, that it is of great importance there should be a communication even with Bombay; for I totally dissent from what was said by Mr. Waghorn, that he considered that result as "worse than nothing." I need not inform the Committee, that for what may be called Government purposes, viz. communications between the Home and the Local Authorities, this scheme answers every object. The communication is as rapid from Bombay to Agra, as it is from Calcutta to Agra; and with reference to the important frontier of the Indus and Sutledge, I have heard that a steam-boat might communicate even with Lodhiana, by an 18 days' passage from Bombay. In fact, to say we have done nothing by establishing this communication with Bombay, is rather the opinion of a partizan than of an impartial observer.

Let me remark, also, in reference to what was stated by Mr. Waghorn, that his services had been overlooked by His Majesty's Government, that the present Board of Admiralty have declined to promote him to a lieutenancy, in consequence of certain rules of service which had induced two former Boards of Admiralty to come to the same conclusion. At the same time, the King's Government have, in conjunction with the Court of Directors, shown every disposition to acknowledge the merits of Mr. Waghorn. The Court of Directors have, in the first place, given him a sum of money for his past exertions, and they have, in conjunction with the India Board, now given him the appointment of deputy-agent and superintendent of the India mails in Egypt; and, in compliance with his own request, they have moreover advanced to him one year's salary.

I forgot to refer to that subject which the noble Chairman called to our notice previously to my beginning to give my evidence. I allude to the Bombay marine. The Committee are aware that for some time an opinion has been entertained that the Indian navy should be placed under the command, or merged, in fact, in the command of the King's officer in those seas. Such a proposal has been made more than once, but it has hitherto not yet been carried into effect. Since, however, the question of steam navigation has been more particularly brought before the attention of the Indian and the Home authorities, a suggestion has been made, that perhaps instead of annihilating the Bombay marine altogether, it might be advisable to convert that naval force into a steam flotilla. Indeed when it was thought fitting to send out the Atalanta and Berenice steamers to India, it was resolved by the Home authorities that at the same time a reduction should take place in the Bombay marine, so as partially at least to cover the expense of those two steam vessels; and this substitution has been, and I think very justly, considered as something like the first step towards effecting the object to which I have alluded. Any gentleman who looks at the Indian register will see what the force of the Bombay marine is, and it will there appear that by converting that force into a steam flotilla, it will be very possible, and indeed very easy, to obtain all the objects which are sought for by a more extended plan of communicating with the three presidencies by means of steam.

I should state, that although there is no formal proposal now made from the Court of Directors to the India Board, and no positive plan for carrying into effect this object, yet I have good reason to believe, that such a scheme is at this moment entertained by a certain portion of the Court of Directors; and that it is more than probable that in a very short time that proposal will be introduced in a formal manner to the Court itself, and afterwards of course, if it receives the assent of the Court, will be laid before the India Board. I should wish to be understood as saying this only with reference to that portion of the Court of Directors with whom I am in official and weekly communication, but I repeat that it is my hope and conviction that this proposal will finally receive the consent of the Court, and that within no long time the Home authorities will be able to communicate to the public and to the Indian Government that it has been altogether decided upon.

Jovis, 22° *die Junii*, 1837.

MEMBERS PRESENT.

Mr. Bagshaw.
Lord William Bentinck.
Mr. Crawford.
Mr. Gordon.
Sir J. Graham, Bart.
Sir J. Hobhouse, Bart.
Mr. Mullins.
Lord Sandon.
Sir T. Troubridge, Bart.

LORD WILLIAM BENTINCK, IN THE CHAIR.

Captain *Alexander Nairne*, called in; and Examined.

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195. *Chairman.*] YOU have been in the East India Company's service?—I have.

196. What ship did you command, and for how many years were you in the service?—I commanded the General Kidd; I entered the service in 1803.

197. You are very well acquainted with the Indian seas?—Yes; I have some little knowledge of them.

198. Have you made several voyages to Bombay and Calcutta?—I commanded that ship eight voyages.

199. Do you conceive that there is any difficulty in a steamer making a passage up and down the Bay of Bengal in all monsoons?—I think there is no difficulty at all; I speak from the experience that I have had with steamers in this country, and if the Committee will allow me to give one or two instances, I think it will be more convincing than anything else. About nine years ago I was like most old sailors, very much against steam communication. I was coming from Rotterdam in the Attwood steamer, a very small vessel; we were obliged to anchor at the Brill, the wind blew so hard; after a time the weather appeared to be a little better, and the commander got the vessel under weigh; but when we got on the flats (there is a very long flat sand there, between the buoys), the vessel hardly went a-head at all, it blew so hard. After remaining in this state some time, going very little a-head, he said to the pilot, in an under tone, I was pretty near him, "We must go back:" the pilot said, "We cannot go back, the water has fallen," on which the captain showed a good deal of nerve, and said, "I think the weather is clearing up," and looked about so as not to alarm anybody, "and we will go on." He was in this situation for an hour and a half, and the vessel was literally knocking herself to pieces; but notwithstanding, when she got the tide in her favour, she gradually crawled out; it was from that moment that I began to see the power of steam; that vessel was a vessel of very small power; I should say that it blew so hard that it would have brought vessels within one reef of being close reefed. But I will simply mention another instance when coming from Scotland last February in the Clarence; we left Leith Roads at one in the afternoon, and about midnight it began to blow very hard from the south-west; on the following day, when we were within five leagues of Flamborough Head, we came up with a fleet of colliers, between 200 and 300; those colliers were under close-reefed topsails and foresail, nothing else; their square mainsail furled. This will be better understood by seamen; the colliers do not often take in sail till the very last. When we got to the Head, the wind was directly a-head, and several of the colliers who were a-head of us, were bearing up to take shelter under the Head, and the Clarence at that time, I am quite satisfied, never went less than four knots an hour.

200. Mr. *Mullins.*] What was her tonnage and horse power?—I thinks he has two eighties; that is the favourite size; they call her 1,000 tons, but I should hardly think she is that; I should think not above 800 or 900.

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201. Her usual rating is 1,000 tons?—Yes.

202. Mr. *Crawford.*] Does not the difference of tonnage arise from the peculiar shape of steamers?—Yes; they would not take them as above 700 or 800 tons in other vessels. I have been in various steamers; I have been in the Monarch under almost the same circumstances, about four years ago.

203. *Chairman.*] What was her tonnage?—She is called 1,000 tons also.

204. Do you think the force of that south-west gale was equal to the force of the south-west monsoon which you have seen in India?—Decidedly; I will give a proof; those colliers were under close-reefed topsails; in coming out of Bombay harbour in the strength of the south-west monsoon, vessels never exceed the double reef in their topsails, and generally only the single reef; it is rather too much sail to have, but still they prefer to have it to force the ship out because they must get the offing before the flood tide sets in.

205. In what way would you propose that the passage should be made from the Hoogly to Madras in the south-west monsoon?—I should propose that they went over from the floating light to Point Palmyras, and that side of the bay the wind is generally less strong there on shore, you may get a little more sea, the squalls come from the north-west; but if it blew so very hard that they really could not go across (for the great difficulty will be in going across what they call the reefs from the floating light to Palmyras, there are three reefs to cross, you may call them two reefs where there is a very high sea), if it was blowing so hard that you could not get across, it would be a very simple business to keep on the starboard tack, and let them fetch down within the Island of Andamans; although it is a lee shore all the way down, you get into variable winds and smooth water almost as soon as you are withinside of the Island of Andamans, and that breaks the sea all the way down, and after you get well down the bay you might take sea then, because it is only in spring tides that it blows very hard, you might stand across for Madras.

206. Mr. *Crawford.*] Then you would get to the southward by south-south-east?—Yes, it is the way that all the East India Company ships go to China; when on the starboard tack, they never think of tacking.

207. What number of days would you estimate a passage under those circumstances to Madras from the mouth of the Hoogly, in such weather as would give you occasion to go to the south-eastward?—That requires to be turned in my mind in estimating the difficulties; but I should think that the passage might be made, even under the circumstances that I state in going down, in six or seven days.

208. *Chairman.*] In this mode of making the passage, you do not contemplate going in the face of the south-west monsoon?—This is if you cannot get across to Point Palmyras, if it should be blowing so very hard that you cannot reach that point.

209. Have you often seen such weather that you could not get across to Point Palmyras?—I have never seen it.

210. Mr. *Mullins.*] In the observations you have just made, are you speaking of sailing vessels?—Yes, I am speaking of sailing vessels, not of steamers.

211. *Chairman.*] Having made for Point Palmyras, would there be any difficulty in going down the coast to Madras?—I should think none.

212. The land and sea breezes prevail all along the coast, do not they?—In the strength of the south-west monsoon, I should say that, unless you are very close in, they do not; that is to say, they do not extend far out, but the squalls come from the north-west, and of course that is the leading wind there.

213. How far do the land and sea breezes prevail from the shore?—I am not prepared to say, for I never went down.

214. Have you been at anchor in Madras Road?—Yes, I have.

215. Do the land and sea breezes prevail there?—Yes; there is one part of the year when there are along-shore breezes.

216. Do you know the voyage from Madras to Point de Galle?—No; I have not had experience in that at all, except from hearsay.

217. Do you know that the south-west monsoon blows up in the centre of the bay particularly?—Yes, it does.

218. With a powerful steamer, such as you have been in, could you make any

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any way directly in the teeth of that south-west monsoon?—I think powerful steamers would make head against it; but there is a remedy for it; if at any time it did blow so hard, you might go to the southward assisted by canvass, and then you would get into the variable winds, and get up in that way; I presume you are alluding to making the passage to Bombay.

219. Do you think the passage might be made from Bombay direct to Socotra by a steamer in the south-west monsoon?—I think it might.

220. How would you make it?—On leaving Bombay harbour, I would endeavour to go direct for it; if I found we did not get a-head, I would go to the southward. It is a well-known fact, that the south-west monsoon does not blow strong till you get within 30 or 40 leagues of the coast of Bombay; you have very often fine weather 30 leagues off, and the instant you get in you have hard squalls and rain. I was in Bombay three years ago, from July to October, and almost every ship that came in I put the question to them as to what kind of weather they had had before they made the land, and I think nine out of ten said that they had fine weather within 40 leagues or 50 leagues of Bombay.

221. How many miles an hour, upon the average, do you suppose that a strong steamer would go against a south-west monsoon from Bombay to Socotra?—I think from four to five miles an hour in the strongest. I sailed on the 1st of October, but from the 15th of June to the 15th of August it is the hardest; July and the early part of August is the strongest part of the monsoon.

222. Mr. *Mullins.*] Do you think it would be advisable, in cases where you could go only at three or four knots an hour, to venture the direct passage, looking to the possible injury to the machinery?—I think you would get out of this violent weather by going a little out of the common route; you might angle it, so as to bring the wind four points, and five points in the bow.

223. Then you think it would be advisable to do so in place of going direct under such circumstances?—If the weather is such, that you are likely to injure your machinery; but from what I have seen of steamers in this country, I should not apprehend any difficulty at all against a monsoon, so hard as I have seen it in India.

224. *Chairman.*] You know that the distance is 1,200 miles?—It is about 1,260 I believe; I ought to mention that I am rather taken at a disadvantage to-day, not being aware that I should be examined, or I should have made myself master of the distances.

225. Mr. *Mullins.*] Suppose a vessel were to encounter a strong wind during the entire of her voyage between Bombay and Socotra, should you think it advisable to follow the direct route?—No, I would go to the southward.

226. Mr. *Crawford.*] Your direct course is to the westward of south, and in such weather you would make to the eastward of south?—Yes, I would go on the larboard tack; I would take the coastways first of all; we find no difficulty in the large 1,200 ton ships coming with a cotton cargo, which is a very unfavourable one for a ship against the wind, going down the coast on the larboard tack.

227. Mr. *Crawford.*] But the south-west monsoon is a fair wind when you get out of Bombay harbour, is it not?—Yes, but the wind blows in very hard, winds from west to east; but I would have no hesitation in going down the coast a little, and then branching off immediately.

228. *Chairman.*] You would go so far to the southward till the south-west was a fair wind for you?—Till the wind slackened a little; you never have the wind blowing so hard more than three days in the full and change.

229. How far south would you go; would you go as far south as Goa?—No, decidedly not; I am saying, if it is blowing hard, and the vessel is going out at the full or change, you do experience then hard squalls from west-south-west, and west-north-west.

230. Sir *J. Graham.*] Have you any experience with regard to the wear and tear of machinery in such a struggle as you have referred to, if protracted for many days?—No, we were 20 hours that occasion that I referred to; and once in the Monarch 20 hours; but there was not the least appearance of strain on the machinery, or of the vessel; I was quite astonished with the Clarence, the last vessel I was in, last February.

231. Did you make your passage throughout in the wind's eye?—As soon as

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we got round the Head the wind came to the southward, and it nearly came a-head; every point we came to the wind was directly a-head.

232. Did not they keep several points off the wind?—Never once; they headed it the whole way.

233. They did not keep her away at all?—Not at all; they did not appear to think anything of it; they said it did not blow very hard. I said there are colliers under close-reefed topsails. They said it was nothing to what they had had before.

234. What was the sea as compared with the Indian sea?—I should say the sea was quite equal to any sea you will meet with in the Indian sea, when we came round Flamborough Head.

235. Judging from what you then saw, you think that a steamer with equal power could, throughout her course from Bombay to Socotra, make four knots an hour?—I do.

236. As to the wear and tear upon the vessel and the machinery, you have no information resting upon your own experience?—No, I have none; but from what I saw, I should say that there can be but little fear of the machinery.

237. *Chairman.*] And notwithstanding that the voyage is as long as 1,200 miles, you still think that there would be no fear?—I do.

238. Mr. *Mullins.*] You have already mentioned that you would advise a southing?—If the vessel did not go a-head.

239. If she did go a-head ever so slowly, would you recommend her to sail direct?—Yes; I am almost sure that the vessel would go in face of the monsoon at any time; just in getting out of Bombay harbour at the full and change, when it blows hard for two or three days, you would be obliged to go to the southward.

240. Does your experience of steam machinery warrant you in asserting that no damage could arise from continual straining in hard weather in so long a voyage?—I have not experience enough to say completely; but from what I have seen I should think there is no difficulty.

241. Sir *J. Graham.*] You are not prepared to say that the passage might not be made more quickly by keeping the vessel three or four points from the wind by traverses?—For a day or two during the prevalence of those spring tides.

242. That would be a question of time?—Entirely.

243. *Chairman.*] And wear and tear?—Yes; perhaps the wear and tear is more material than the other.

244. Sir *J. Graham.*] It would make a great difference in the strain of the vessel whether she were kept five points off the wind, or went direct?—No doubt by making traverses you might ease the vessel considerably.

245. Mr. *Mullins.*] Have you ever visited the Island of Socotra?—Never.

246. Have you been in the Red Sea?—Never.

247. Sir *J. Graham.*] As to steamers going round the Point de Galle, have you no fear of any particular danger in those seas as affecting steam navigation?—There is a very strong current setting round there at times, which might make a difficulty in getting round; but they would go off to the southward, it might prolong them a day or two.

248. As to the gales in those seas which you traversed in steam-vessels, are they heavier than those in the Indian sea?—Not heavier.

249. Mr. *Mullins.*] Do you know anything of the passage between Ceylon and the main land?—No, I do not; but I should think there would be very little difficulty in a steamer going between the Bassas and the Island; I understand the question to be with reference to that. Ships never go withinside of those reefs that run out from the island, and I understood the question to be with reference to her going withinside. It is very possible for a steamer to go withinside of those.

250. Is it your opinion that it would be perfectly safe for a steamer?—Yes.

251. Have you visited Trincomalee?—Never.

Sir *David Dunn*, called in; and Examined.

Sir *David Dunn.*

252. *Chairman.*] HOW long have you been Post-captain in His Majesty's navy?—Going on 24 years.

253. When, and how long were you upon the Indian station?—About three years.

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254. At what period?—From April 1832 to April 1835; I speak of being absolutely in India, at Trincomalee, during the time I have mentioned.

255. You are, of course, acquainted with the Bay of Bengal and the shore?—I was voyaging there the whole of the time.

256. Would there be any difficulty in a steamer making the passage from the Hoogly to Madras and Point de Galle in the south-west monsoon?—I should say none, judging of the power of steam in Europe, not of Indian steamers.

257. How would you make that passage?—I should say from the light-vessel to Point Palmyras, and from thence along the shore on to Madras, as close to the shore as possible.

258. Is there no difficulty between the light-vessel and Point Palmyras during the south-west monsoon?—I should say that the tug of the vessel would rest in making that passage of 60 or 80 miles, but I should not fear any steam-boat such as is navigated in Europe in not making it, particularly as she would not bow the sea; she would be on the larboard tack, perhaps fore and aft sails drawing.

259. Does the south monsoon blow home on the Coromandel coast?—Certainly not; across the Sand-heads it blows, because there is no high land there.

260. From the Point Palmyras to Madras the south-west monsoon does not blow home?—It does not; I have anchored in all parts of the coast in the height of the south-west monsoon.

261. From Madras to Point de Galle would be the same, would it?—Smoother, decidedly smoother, for the south-west wind would be blowing off Point de Galle and Ceylon.

262. Then the south-west monsoon in the Bay of Bengal opposes no obstacle whatever?—None to a steamer; I judge by the steamers in Europe, not by the steamers in India.

263. How many knots an hour do you suppose that a powerful steamer, take the Berenice, of 240 horse, and 700 tons, would be going this course in the south-west monsoon?—At starting from the light-vessel to Palmyras, I should say four or five knots an hour for that distance, whatever it is, 80 miles, I believe; from Palmyras to Madras I should say six; from Madras to Point de Galle seven or eight; under the lee of Ceylon smooth water.

264. Are there not occasionally gales of wind on that coast that do blow home?—The monsoon gales, that is, the periodical storms at the change of the monsoon, blow home most furiously, but they do not last more than 30 or 48 hours at the utmost.

265. Lord *Sandon.*] Are those so periodical that you can be aware of them beforehand, and avoid them?—Invariably, by the barometer.

266. So that no vessel need be exposed to them?—None; you may know them three or four days before they come; the barometer does not act quickly there generally, but on those storms invariably.

267. Sir *J. Graham.*] Are there harbours into which the Berenice could put between Madras and Point de Galle, and between Madras and Palmyras?—Between Madras and Point de Galle, Trincomalee; between Madras and Palmyras, none.

268. If she were caught in one of those monsoons which do blow home, would her fate be inevitable?—By making an offing of 100 miles, as we do under canvass, we find the wind very much less than towards the shore, and I should apprehend no danger by her lying-to; she must not attempt to proceed.

269. If she were caught close in, what must she do?—By the previous warning the barometer would give, if she were on the coast she ought to make an offing.

270. Her safety would depend upon her offing being secured before it blew hard?—I should say so; but the barometer invariably acts; we leave the roads under canvass, and ride the gale out by lying-to 100 or 120 miles out.

271. *Chairman.*] Is there any instance of a man-of-war having been lost in one of those gales?—I believe the Dover, commanded by Sir Edward Tucker, was stranded there in a monsoon gale at the period of the expedition to Java.

272. In the north-east monsoon, is there any difficulty whatever in the Bay of Bengal?—None whatever.

273. It is a still monsoon in comparison with the south-west, is it?—The power of the wind is by no means so strong as the south-west.

274. How

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274. How many knots could you go against the north-east monsoon?—I should say, averaging six or seven.

275. Are you acquainted with the harbour of Point de Galle?—No, I am not.

276. Do you know anything respecting it from report; you must have heard from the officers of the navy, whether steamers could make use of it as a port?—I have always understood that it was admirably adapted for steamers.

277. For the repair of steamers, would not Trincomalee afford every sort of convenience and advantage?—I should say, decidedly.

278. Is there a King's dock-yard there?—There are ample means if artificers are sent; the accommodation is ample.

279. Mr. *Crawford.*] Do you happen to know why artificers are not kept there?—Owing to the foreign dock-yards being reduced to certain establishments, and that among the rest.

280. Have you ever heard it attributed to the unhealthiness of Trincomalee?—Never; and of late years Trincomalee has decidedly improved in that respect.

281. From what cause?—They have opened a road from the Candian country to Trincomalee, and the jungle immediately adjoining Trincomalee has been cleared away very extensively, and has added much to the healthiness of the place.

282. Is there a rising and falling tide there?—About three feet, not more than three feet.

283. *Chairman.*] What is your opinion of the practicability of making the passage from Point de Galle to Socotra, in the south-west monsoon?—I should say in the strength of the south-west monsoon there might be a difficulty in rounding Point de Galle by keeping in the current, but, perhaps, by going inside the Bassas, the passage might be made even in the teeth of the south-west monsoon; the Bassas are the shoals that lie off, but the rush of current from the Malabar coast in coming into Bengal is to be avoided.

284. Sir *J. Graham.*] How many knots does that run?—I have experienced from two to three and a half; I have heard it stated more, but have myself experienced that.

285. Does it vary, or is it uniform?—In the height of the south-west monsoon is it steady for six weeks or two months of the fury of the monsoon, but it falls off rapidly and changes prior to the change of the north-east monsoon. In the event of not being able to force a passage close in by Point de Galle, the difficulty, in my mind, can be obviated by making an offing on the starboard tack of 100 or 150 miles to a low northern latitude, and then going on the larboard tack with canvass set, I should conceive, steering for Socotra. Socotra I have never been at; I have no personal experience of Socotra.

286. Mr. *Crawford.*] Do I understand you as supposing such weather as would render the calling of the steamer at Point de Galle impracticable?—Not of calling, but of rounding Point de Galle. In the event of the current being too strong for that six weeks or two months (for I do not think that it is longer than that), in that case I recommend the going under canvass on the starboard tack, and making an offing 100 or 150 miles, and so keep out of the current with a regular sea, not a chopping sea, and you would fetch Socotra even if your machinery broke, I conceive.

287. Lord *Sandon.*] Should you go to the south of the Maldives?—Yes, perhaps; as I drew off from Point de Galle, the wind might draw to the southward, I would lie south-east, and when I had made offing and the wind had headed me, I conceive that I might weather the Maldives; I would stand on for Socotra under canvass and steam. I have no personal experience of being at Socotra; my experience is entirely confined to the Malabar coast.

288. Sir *J. Graham.*] Have you much experience of the sea to the westward of Point de Galle?—I have crossed that about six times.

289. How far to the northward have you been towards the Persian Gulf?—In coming from Batavia to Bombay, through the straits of Sunda, I rounded Point de Galle about 120 miles or perhaps 150 miles.

290. Do you think in Europe we have any experience of steam navigation of such length and such difficulty, considering the strength of the currents, as the passage between Socotra and Trincomalee, rounding Point de Galle?—Yes; I conceive the passage from Falmouth to Gibraltar, in the winter months, to be quite equal to that passage.

291. Bearing

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291. Bearing in your mind the currents of the monsoon and the sea, such as you have seen it?—The currents can be avoided, by making the offing that I speak of.

292. Do you think the whole passage across the bay from Falmouth to Gibraltar is formidable?—Quite; I have no personal experience of those long voyages, but from what I have seen in winter passages, in steamers of 160-horse power, I should say quite.

293. The distance is greater, is it not, from Socotra to Trincomalee, rounding the Maldives in the way you recommend, than from Falmouth to Gibraltar?—I should say greater, certainly.

294. With regard to the sea?—The sea is not equal, in my mind, to what is encountered in the winter in the Bay of Biscay, and off the coast of Portugal round Cape St. Vincent, and on to Gibraltar.

295. Did you encounter any bad weather in those six voyages that you made yourself in those seas?—It is squally and unsettled weather in the south-west monsoon always; but when the squalls blow over, a calm almost always intervenes for a short time.

296. But in those European seas you have seen many gales; in those six voyages in India, do you consider that you saw heavy weather or not?—I conceive that the passage from Falmouth to Gibraltar in the wintry weather is far more severe than any weather I ever experienced in India in the south-west monsoon.

297. Lord *Sandon.*] Were all those six voyages in the south-west monsoon?—No, two of them.

298. Sir *J. Graham.*] Was it ordinary weather in those cases?—Double-reefed topsail weather.

299. You have seen something more formidable than that in the European seas?—A great deal.

300. Have you reason to believe that there is never anything more formidable than what you encountered in those six voyages?—I have heard of it being more severe, but I have rarely been in weather in India more than treble-reefed topsails.

301. And the information which you have received from your brother officers leads you to believe that that is rarely experienced?—What I have experienced is double and treble reefed; I have heard of close reefed, but I have never experienced that, excepting once.

302. Your information and experience would lead you to believe that the worst weather in the Indian seas is not so bad as the winter gales prevalent in the Bay of Biscay?—Certainly.

303. That is the result both of your experience and inquiry of your brother officers?—That is the conviction of my mind from what I have heard.

304. Sir *J. Hobhouse.*] Nor the navigation in other respects of the Indian seas more difficult?—By no means so difficult.

305. *Chairman.*] In going to the southward, the distance where you would encounter bad weather, and a strong current, is confined to that 100 or 150 miles, is it not?—I confine my observations as to the strength of the current and the power of the wind in the south-west monsoon to the distance of 100 or 150 miles from the Bassas.

306. How many knots an hour should you go those 150 miles with a powerful steamer such as the Berenice?—Going on the starboard tack under canvass and steam, I should say for the 100 or 150 miles, she would average five knots an hour.

307. Then, what course would you take when you had got 150 miles?—I would then go on the arboard tack, under steam and canvass, as near as she would lie to the wind, taking it for granted the wind would be to the southward; south-west, perhaps south-south-west at that distance from the land.

308. How many knots an hour should you make then?—I should say, averaging six or seven.

309. If your machinery broke could you make a sailing passage of it?—I should think the passage might be effected under canvass in the event of the machinery breaking.

310. Sir *T. Troubridge.*] Always speaking of Socotra?—I have no personal knowledge of Socotra.

311. Mr. *Crawford.*] Do you still consider that you should not have occa-

sion to go to the south of the Line; you said that you would have a low northern latitude?—I conceive that I should have no occasion to go to the southward of the Line to effect my passage; I might pass to the southward, but if not, the passage is free between the islands, and smooth water the whole of the way; in the event of not passing to the southward of the Maldives, I should say the eight-degree channel.

312. Lord *Sandon.*] The Maldives giving you a shelter from the violence of the monsoon?—Yes.

313. *Chairman.*] How many knots an hour could you go making a direct passage from Galle?—Going in the teeth of the south-west monsoon, I should shape my course for the eight-degree channel, Maldives and Laccadives, and I think under steam I could make three or four miles an hour against wind and current.

314. Sir *J. Graham.*] What European experience leads you to think that any steamer you have seen could make three knots an hour against the wind you have seen, and the current you have described?—I judge from a steamer from Londonderry to Liverpool of 160-horse power; from what I have seen, I judge that a vessel of 200 or 250-horse power would do that.

315. The experience here is only against wind: have you any experience of a steamer against current combined with wind still making head at the rate of three knots an hour?—By passing close to the land at Point de Galle, I conceive that the power of current would be neutralized, and consequently, that there would be merely the wind to encounter.

316. When you describe the current as running two or three miles an hour, that is outside the Bassas, and not inside?—Outside the Bassas.

317. Is there a current in the inside channel?—I should say much less than outside the Bassas.

318. What would you put that current at inside at the height of the monsoon?—Perhaps two miles an hour.

319. Have we European experience of such a current with such a wind as the monsoon, and any steamer making head at the rate of three or four knots an hour against it?—The power of the monsoon, such as I have experienced, being from double-reefed topsails to treble-reefed topsails, and the current reduced to two knots an hour, I conceive that the steamer that I have had experience in would make a successful passage.

320. *Chairman.*] How many knots an hour, did you say?—Three knots.

321. How far would that three knots an hour be?—I should confine that current to the distance of 60 or 80 miles from Point de Galle.

322. You are going through the eight-degree channel, are you not?—Yes; no sailing ship ever passes withinside of the Bassas that I know of.

323. If the point of destination were Point de Galle?—In that case the Bassas would be out of the question.

324. Sir *J. Hobhouse.*] Have you had much experience in steam navigation; have you been very often on board steam vessels?—Twelve or fourteen voyages.

325. Sir *J. Graham.*] In what seas?—From Liverpool to Dublin; from Liverpool to Belfast; from Liverpool to Londonderry; at all seasons.

326. You have no experience except in the narrow seas round England?—None.

327. Sir *T. Troubridge.*] Have you made the passage of the eight or nine-degree channel from Point de Galle?—No.

328. Sir *J. Graham.*] Have you experience to the westward of the Maldives and the Laccadives?—No.

329. Mr. *Mullins.*] Have you sufficient experience of the effects of the south-west monsoon to enable you to judge of its effects in the passage between Socotra and Point de Galle?—I confine my experience to 100 miles from Point de Galle, in the south-west monsoon.

330. Sir *J. Graham.*] Then as to the monsoon between Socotra and the Maldives and Laccadives, you have no personal experience whatever?—None whatever, of my own knowledge.

331. *Chairman.*] In what direction, by compass, is that 100 miles, that you would go in rounding Point de Galle?—I should say, from south-west to west-south-west.

332. Was that in the south-west monsoon?—Yes.

333. Mr. *Mullins.*] Have you ever understood that the south-west monsoon blows with greater force, within 100 or 150 miles of the Malabar coast, than

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than at a greater distance from it?—I have always considered the strength of the south-west monsoon to be greater from 100 to 150 miles off the Malabar coast than at a greater distance.

334. Mr. *Bagshaw.*] So that the same rule would govern a vessel going to Socotra as to Bombay, with regard to the monsoon; the monsoon blows steadily from the south-west?—Always.

335. Therefore you would have no objection to navigate a vessel with the experience you possess, from Point de Galle to Socotra?—None whatever.

336. Sir *J. Graham.*] A sailing vessel, none?—I confine my observations to a sailing vessel; I have no experience of steam, except as a passenger.

337. Mr. *Mullins.*] In fact, you have been in that part of the sea where the south-west monsoon blows with the strongest force, or is generally supposed to blow with the strongest force?—Yes.

338. *Chairman.*] Going direct from Point de Galle to Socotra, could you carry sail?—I should say not.

339. Is the wind as unfavourable that way as it is from Socotra to Bombay?—No; from Bombay to Socotra, I should say the wind was immediately in our face; and from Galle to Socotra, I should think the wind would be three or four points on the larboard bow, merely judging from the south-west monsoon blowing, and the number of hundred miles between Bombay and Point de Galle.

340. What difference do you think those three or four points of the compass would give you over the vessel that had the wind dead on end?—I should say two miles an hour at least.

341. Do you think the passage could be made from Bombay to Socotra with the wind dead on end, in the south-west monsoon, in a steamer like the Berenice?—I should think the distance too great for a steamer to make that voyage in the face of the south-west monsoon, but the impression on my mind is, that a steamer can always make an offing from Bombay harbour at any time of the monsoon.

342. Sir *J. Graham.*] By bearing to the southward?—I mean, making the distance of 60 or 80 miles, and then shaping her course along the Malabar coast.

343. To the southward?—To the southward.

344. *Chairman.*] Why do you say the distance would be too great?—I think the distance is 1,200 miles, or about that; the quantity of coal required for that voyage, I should imagine, would be too much for any steamer that I have any knowledge of.

345. How many knots an hour do you suppose that she would be able to go with the wind dead on end?—My knowledge of the south-west monsoon is confined to within 100 miles of the Malabar coast: I should say that she would make that distance two and a half and three miles an hour, perhaps more.

346. Would the force of the monsoon increase or decrease as you go to the westward?—Decrease; I confine my observation to the fury of the south-west gale; in getting out of Bombay harbour we invariably find the force of the wind lessen as we get out, and to pass down the Malabar coast we have the wind abeam, rarely before it.

347. If any accident happened to her machinery she would, of course, be obliged to go back to Bombay?—As a matter of course; there is no alternative.

348. Supposing the fury of the south-west monsoon to prevent her from making the direct passage, even in case she was obliged to make an offing to the southward, when she took her course again for Socotra, would she be in as favourable a position as a steamer going through the eight-degree channel; would she have as many points of the wind in her favour?—I conceive that a steamer making a voyage from Bombay to the southward on the Malabar coast, would fetch to the westward of the Maldives and Laccadives, and consequently, would be on a par with the Point de Galle steamer passing through that passage.

349. You mean that she would fall into the same track?—Yes, meet to the westward of the Maldives and the Laccadives.

350. Then the distance that each would have to run would be about the same, would it?—I conceive that the distance from Bombay to the westward of the Maldives and Laccadives would be greater than the distance that the steamer

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steamer going through the eight-degree channel meeting there at that point would have to run.

351. Has not the moon an effect on the wind under the Line?—In the full and change of the moon we find the south-west monsoon very squally; even in the quartering of the moon we find it always unsettled.

352. Sir *T. Troubridge.*] What notice does the barometer give you on the east coast of Ceylon of an approaching gale?—I have known three or four days' notice, but generally two.

353. That is to say, by continual fallings?—Yes; Sir John Gore ordered me to proceed on board and take command of the squadron, in the event of the barometer falling more, and that was two or three days prior to the blowing.

354. Mr. *Bagshaw.*] In this long distance between Point de Galle and Socotra, going the course that you recommend, would you steam the whole of that long distance?—I take it for granted that the fore and aft sails would draw, perhaps during the whole passage; but my experience is confined to 100 miles of Point de Galle.

355. Mr. *Mullins.*] Should you think that it would be advisable to employ steamers between Calcutta and Suez of a less tonnage than 1,000 tons, or of less horse power than 250-horse power?—I should say the larger the steamer the better, judging from the first class steamers of this country.

356. You think that they could make better headway in the case of the south-west monsoon blowing with its greatest force, than smaller steam vessels?—Certainly.

357. Mr. *Crawford.*] In consequence of the greater power?—They are more steady particularly with the wind a-head.

358. Sir *J. Hobhouse.*] Then it is your decided opinion that a steamer would not be able to carry coals to enable her to go direct from Bombay to Socotra, from what you have seen of steamers?—From what I have seen, I should fear that she could not go that distance.

Lieutenant *Wellstead,* called in; and Examined.

Lieut. *Wellstead.*

359. *Chairman.*] ARE you a Lieutenant in the Bombay navy?—I am.

360. Were you employed by the government of Bombay to survey the Island of Socotra?—I was.

361. How long were you there?—On the first occasion two months, on the subsequent occasion six months.

362. Were you employed in conjunction with Lieutenant Haynes of the Bombay marines?—I was.

363. In what year?—In 1834.

364. Are there any harbours or anchoring grounds in Socotra, where a vessel may lie in safety the two monsoons?—There are two harbours in Socotra, one of which is available in the north-east monsoon, and one of which is available in the south-west monsoon, but there is no single harbour which is sheltered at all seasons.

365. What are they called?—The two harbours are Bunder Delechee, which is available in the south-west monsoon, and which is on the north-eastern side of the island; and the other, Goobet Gollonsier on the north-west.

366. Is there a complete shelter for steamers in those bays?—There is.

367. Is there any swell that would make it difficult to take off coals from shore? —Not the least, it is perfectly smooth water.

368. How near could vessels lie to the shore?—In either case, about a quarter of a mile from the shore.

369. Sir *T. Troubridge.*] An open roadstead, or a harbour?—A harbour.

370. Easy of access for any sized vessel?—Yes.

371. *Chairman.*] Is there any water near there?—Fresh water can be obtained from both of them within a short distance.

372. Good water?—Good water.

373. Then, as a depôt for coals, these harbours are complete?—They are, with this exception, that it would be necessary to shift the hulks from the one to the other at the change of the season, provided hulks were used.

374. Sir *T. Troubridge.*] Are there any dangers at all in the environs of Socotra, rocks or shoals?—None.

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375. *Chairman.*] Were you there at the time the detachment was there?—I was.

376. Do you know the reason why the detachment left the island?—The detachment left the island in consequence of the insalubrity of the station which they occupied.

377. Sir *J. Hobhouse.*] Do you think that that insalubrity applies to tha station only, or to other parts of the island?—It does not apply to the mountains, which are over the station.

378. Sir *T. Troubridge.*] But the establishment for the supply of those vessels must be upon the coast?—If you have a hulk, there is no occasion for any establishment.

379. If there is to be a depôt there, the arrangements must be on the beach?—Yes, but the natives can always shift and unshift the coals; I do not consider that it is necessary to have the troops near the shore, the troops might be kept on the higher ground. Of the first detachment that was sent there, nearly the whole of the Europeans died; they were encamped in a plain at the base of those mountains, and there was a considerable quantity of water; it was a marshy kind of ground; there is a good deal of vegetation there, and the face of the country is the same as that of Africa. When the second detachment came to the island, the officers marched them from the sea-beach directly to the mountains, and did not halt at the beach, and they found it as healthy as in England.

380. Lord *Sandon.*] About what distance are the mountains from the beach?—About seven miles.

381. Sir *J. Hobhouse.*] How long did they remain in the island?—About six months.

382. During that time they were not affected by the climate?—No.

383. Lord *Sandon.*] Were they there at the same period of the year as the ormer detachment?—No, but it was equally unhealthy.

384. Sir *J. Hobhouse.*] Did you ever make the passage from Socotra to Bombay?—I have been from Bombay to Socotra.

385. Have you been often?—Three times.

386. Did you ever go during the south-west monsoon?—Yes; not landing at Socotra, but touching Socotra.

387. By steam?—No, in a sailing vessel; never in a steamer.

388. Was each of those times, or one of those times, during the south-west monsoon?—One of those times, the last.

389. How long were you going?—Thirty-seven days to Mocha, which is the lower part, just within the entrance of the Red Sea.

390. *Chairman.*] How long were you going to the longitude of Socotra?—We pursue a very peculiar route, which can be scarcely conveyed in words. The sailing vessels never attempt to go direct across, but, in place of that, they run down to the southward of the Line, about nine degrees south; then we get the south-east trade, and shape our course to the westward by the Sechells, run into about the longitude of Socotra, and then go due north for Cape Guardafui.

391. Sir *T. Troubridge.*] You go to the westward of the Maldives?—Yes.

392. What time does it occupy?—The average voyage would be about 40 days in a good sailing vessel.

393. To Mocha?—Yes.

394. To Cape Guardafui?—I cannot tell.

395. How long does it take from Mocha to Cape Guardafui?—About 10 days.

396. Sir *J. Hobhouse.*] You never made that passage in a steamer?—No; in one of the Company's vessels of war, a 10-gun frigate.

397. Sir *T. Troubridge.*] What weather did you experience?—We took in a reef leaving Bombay, but shook it out soon after.

398. On the whole, had you fine weather or bad?—That is indicative of the finest weather you can have; that sort of weather in which a boat could have made the passage.

399. Speaking generally, you had fine weather the whole of the way?—Yes.

400. *Chairman.*] But in the south-west monsoon?—Yes. I will mention one fact which is the strongest that can be given, I think, in proof of what steamers might be supposed to do. If a question is put to any seaman, Can a steamer proceed in that direction where a sailing vessel would require to beat to windward?

ward? they would answer, It can. Our vessels have gone across the Arabian Sea, from Bombay to Muscat, at all seasons of the year, and the average passage is 21 days.

401. Sir *J. Hobhouse.*] Even during the south-west monsoon?—Yes; that is, directly against the south-west monsoon.

402. Sir *T. Troubridge.*] What are the difficulties from Muscat to Socotra?—You have the same monsoon against you the whole way.

403. Have you any experience on that coast?—No; no vessel goes along that coast, it is a dead lee shore; we find the wind directly against us going from Bombay to Muscat: I adduce that to prove that there is more importance attached to the south-west monsoon than it deserves; if our sailing vessels can beat against that, what is to prevent steamers going.

404. Do you believe the south-west monsoon to be stronger in the northern part of the Arabian Gulf than it is in the parallel of the eight-degree channel?—It is not nearly so strong in the eight-degree channel; as you approach the Line its force weakens.

405. Sir *J. Hobhouse.*] Do you think that there would be any difficulty in a steamer of the size of the steamer that the East India Company have lately built, passing during the south-west monsoon from Bombay to Socotra?—I conceive that there would be no difficulty.

406. Lord *Sandon.*] Pursuing what course?—Quitting Bombay, I should put her upon the starboard tack, set the sails, and run down to eight or nine degrees north of the Line, where the force of the monsoon is considerably lessened; thence I would proceed direct to the westward by steam into about 52 longitude, and then shape the course for Cape Guardafui.

407. Sir *J. Hobhouse.*] How long would a steam-boat so going occupy?—That requires calculation, which I will go into and give in another day.

408. *Chairman.*] At some period of the monsoon would it be practicable to go direct from Bombay to Socotra?—Yes, at some periods; I would not attempt it at the height of the monsoon.

409. Fox six weeks?—Longer, two months; but it is found in the Mediterranean that they never put their heads directly against it when they can help it; they encounter it three points from the wind, and they find they make better way by it.

410. Sir *J. Hobhouse.*] Have you had much experience of steam-vessels?—Not much; I never belonged to one. I came overland from India, and in one by the Mediterranean.

411. *Chairman.*] The opinion of the persons in India is very much altered as to the possibility of making this passage, is it not?—Very much, indeed.

412. Mr. *Bagshaw.*] Have you had any experience in the Bay of Bengal?—Not so much as in the Red Sea.

413. Have you been up to Calcutta?—Yes.

414. Along the coast of Coromandel?—Yes.

415. Lord *Sandon.*] Did you ever face the south-west monsoon?—I once came round.

416. Sir *T. Troubridge.*] Have you any experience of making the passage by the coast?—No.

417. Are you acquainted with the passage from Point de Galle to the Red Sea?—No; except being acquainted with the state of the weather off the Maldives.

418. Lord *Sandon.*] Should you conceive that there was any difficulty in going from Point de Galle in the south-west monsoon towards Socotra?—Not if they adopt the course which I propose, to get more to the westward before they go to the north.

419. Would you take them through the eight-degree channel?—I conceive so, that would be the best.

420. Sir *T. Troubridge.*] Have you ever been through yourself?—Yes.

421. *Chairman.*] Are you acquainted with the island of Abdalkoory on the southern coast of Arabia?—It had not been surveyed when I quitted the coast, but a survey has since been made of it; the report has not arrived.

422. Do you know whether it is favourable as a depôt or not?—That I cannot answer.

423. Macullah, are you acquainted with?—Very well, indeed.

424. Is it fit for a depôt?—In the north-east monsoon it is the most admirable that can be selected; but in the south-west it cannot be approached.

425. What

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425. What is your opinion of Aden?—Aden also would answer very well for a depôt in both monsoons.

426. How does it happen to serve for both monsoons?—It has two harbours.

427. Sir *T. Troubridge.*] How far to the westward of Socotra does the south-west monsoon extend?—As far on the Arabian coast as the port of Aden.

428. How far from the Arabian coast within the Gulf of Aden?—Nearly mid-channel; but by keeping on the African coast the monsoon is avoided, and smooth water is obtained.

429. Lord *Sandon.*] Then, from Cape Guardafui to the Straits of Babelmandel, you might sail in perfectly smooth water by keeping along the African shore?—Perfectly.

430. Then there would be a reason for not looking to the Arabian shore at all for a depôt for coals?—In the south-west monsoon you cannot look to the Arabian coast for coals.

431. *Chairman.*] If you have a depôt at Socotra, you will stand in need of no depôt whatever on the Arabian coast outside of the Straits of Coromandel?—That is my opinion.

432. Have you any doubt of Socotra?—I have mentioned the doubt whether the seas were not too heavy for steamers, but that opinion gives way to the opinion of others, that the sea is not too heavy for steamers.

433. Sir *T. Troubridge.*] Is it a short chopping sea?—It is a meeting of seas.

434. Lord *Sandon.*] Are the principal dangers of the sea to the east and west of Socotra?—We generally pass to the northward of it, where we experience the swell.

435. *Chairman.*] What are the objections to Tamarinda Bay?—In the north-east monsoon the heaviness of the swell producing a dangerous surf from the sea beach, and rendering landing at most seasons almost impracticable. In the south-west monsoon it is equally bad anchorage, in consequence of the holding ground being very indifferent, and the violence of the gusts that sweep from the mountains.

436. Why is the other bay free from the same objection, both being under the lee of the island?—Bunder Delechee is sheltered from the violence of the south-westerly winds by the mountains that rise up close by the shore; calms and light breezes prevailing there when violent gusts are experienced in Tamarinda Bay. Goobet Gollonsier is sheltered from the north-east monsoon and swell by the projecting point affording every necessary degree of shelter to vessels lying there at that period.

437. Were you, for any length of time, employed in the Red Sea under the orders of the Bombay government?—I was employed for three years in the survey of the Red Sea, under the orders of the Bombay government.

438. When was that?—In 1830, 1831 and 1832.

439. Are you acquainted with the whole of it?—I am.

440. Is there any difficulty in a steamer of power like the Berenice, going through the Straits of Babelmandel?—Not the least.

441. Is there any difficulty from thence to Suez?—None.

442. At no season of the year?—No.

443. Are the winds in the Red Sea less strong than the south-west monsoon in the Arabian Sea?—About the same strength.

444. With respect to steamers, you think that steamers in the Red Sea should be of the same power as those without?—I do.

445. What is your opinion of Mocha as a station?—That it cannot be made available as a station; I speak most decidedly; for during nine months of the year the southerly winds blow with such violence that you can only communicate with the shore at intervals, and it is an open roadstead.

446. Which do you think the best station between Socotra and Suez?—The island of Camaran, which is a good harbour, is partially susceptible of cultivation; has great advantage in its insular position, which should not be forgotten; where you have anything to do with the Arabs, you will find it much better to be upon an island than to be upon the main land; and five fathoms of water between the island and the main.

447. Sir *T. Troubridge.*] Is there any difficulty in the navigation into this harbour?—Not any.

448. Is there any lighthouse?—No.

449. Is

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449. Is it necessary to have one?—Should it be made a permanent station, it might be considered advisable to have a lighthouse.

450. Lord *Sandon.*] Is the weather very hazy?—Sometimes.

451. Is the climate healthy?—I do not consider any part of the southern part of the Red Sea is healthy; people there are subject to a kind of dropsy, which affects all the extremities.

452. Sir *T. Troubridge.*] Is the anchorage safe after you have got through the channel?—It is sheltered from all winds.

453. Lord *Sandon.*] Is there any difficulty in approaching it at all winds? —No.

454. Sir *T. Troubridge.*] What is the width of the channel?—As far as I recollect, about a mile and a half broad.

455. Lord *Sandon.*] What is the formation of the island?—Like all those islands, principally of shelly limestone.

456. Is there water upon the island?—Very good water; that island has been always considered as a point of great importance; when the Portuguese first went to the Red Sea it attracted their attention, and during the time that the French were in Egypt a mission was also sent to examine it.

457. Is it peopled at all?—It has a few inhabitants.

458. Is its soil capable of cultivation, and of containing a larger population, in case a depôt were fixed there?—Yes.

459. *Chairman.*] Is it high ground?—No, rather flat and low.

460. Lord *Sandon.*] Is it based upon coral?—Coral enters very largely into the formation of all those islands.

461. Mr. *Mullins.*] Is it not equidistant from Suez and Socotra?—I do not know that, but I should imagine it is not very far from being so.

462. Sir *T. Troubridge.*] You spoke of five fathoms, is it five fathoms low water?—There is very little rise and fall of the tide.

463. Lord *Sandon.*] Two feet?—Rather more; the difference between high and low water is between three and four feet.

464. Sir *T. Troubridge.*] What are the prevailing winds in the Red Sea?—The north-westerly winds prevail throughout the year in the northern portion; but in the months of July, August and September they are at their height, and frequently then blow the whole distance of the sea to Mocha. Southerly winds prevail in the southern portion for nine months of the year, blowing near the entrance of the Straits of Babelmandel with equal violence with the north-westerly breezes in the upper portion of the sea. The space equidistant from either extremity of the sea is left subject to calms and variable winds, excepting when the southerly winds blow strongly in September, October and November, when they not unfrequently blow home to Suez.

465. Are there any currents?—The currents in the Red Sea are not of sufficient importance to attract much attention as regards steam navigation.

466. The information which you have given the Committee is entirely from experience?—It is.

467. Both as to Camaran and the winds?—Yes.

468. *Chairman.*] How far are the following places on the coast eligible as depôts: Hodeida?—Open roadstead; very indifferent.

469. Soheia?—Objectionable, in consequence of the shallowness of the water.

470. Camfida?—Also indifferent anchorage.

471. Jidda?—Jidda has been hitherto used as a coal depôt; and I see no other objection to it than that which occurs to any other port in the Red Sea, that it is a port fronted by almost innumerable coral rocks, so that you cannot get in at night time.

472. Yambo?—Yambo would make a good depôt.

473. Mr. *Mullins.*] Is it your opinion that Camaran is the best depôt of all those that have been named in the Red Sea?—Decidedly; a glance at the chart will show that there are no reefs fronting this part of the coast, and having a depôt there, we should not be subjected to any annoyances from the Arabs, which I look upon as unavoidable in every station on the shore; and also, it is a central position between Suez and Socotra.

474. *Chairman.*] On the western coast of the Red Sea are there any ports?—There are several ports on the western shore, but I would avoid that shore.

475. Why?—Because the navigation is more intricate and more dangerous.

476. Lord *Sandon.*] As regards the winds, are the two shores equally advantageous?—

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tageous?—The winds blow up and down the sea, so that it makes very little difference.

477. *Chairman.*] In case the plague, or war, should at any time interrupt the passage through Egypt, is there any other course by which the communication could be kept up by the Red Sea with which you are acquainted, or about which you have made inquiries?—I would beg to draw the attention of the Committee to the old and now almost forgotten route by way of the Gulf of Akkaba to Garsa; a Roman road formerly extended between those two points, and a communication by this route might be obtained when it might be found impracticable through Egypt. There is an anchorage near the northern extremity of this sea, under a small island.

478. Lord *Sandon.*] Is there any difficulty in navigating that part of the Red Sea?—It cannot be navigated but by steam, that gulf.

479. What width?—Ten to 12 miles, but has no good anchorages.

480. Mr. *Mullins.*] Have you any knowledge as to whether there are wells across the desert from that point to the coast?—To my knowledge that route has not been traversed by any European.

481. *Chairman.*] During the three years when you were in the Red Sea, was there any occasion when the plague would have interrupted the intercourse by the Red Sea?—Not once.

482. Mr. *Mullins.*] From the result of your examination, which of the two ports should you prefer, Suez or Cosseir, for the convenience of passengers, and also for celerity?—Suez.

483. Lord *Sandon.*] You say that no interruption to the communication during those three years took place on account of the plague, was that on account of any extra cessation of the plague during those three years?—It might have been owing to that, but the caravan travels at all periods with pilgrims, whether the plague prevails in Egypt or not, between Cairo and Mecca; and yet, as far as my inquiries have gone, I never could find that it had more than once visited the Hedjehz.

484. What are the Hedjehz?—Places in which the holy cities of Mecca and Medina are situated.

485. Travellers would be exposed, however small you may estimate the risk, to the plague at certain seasons of the year, in passing from Alexandria to Suez?—Whenever it exists of course there will be a risk.

486. Is there a probability that, if the current of communication through Egypt by the Red Sea were to become more frequent, the plague would be transmitted beyond its present limits?—I do not think there is; the previous question would show that it seldom leaves the immediate vicinity of Cairo and other cities in Egypt; it does not extend to the desert; it never accompanies the pilgrims; the previous question and answer will be received as a strong corroboration of this.

487. Mr. *Mullins.*] Have you ever been between Suez and Cairo?—Yes, several times.

488. Is there any facility for obtaining water?—No; there is some water about 12 miles from Suez, but very bad.

489. You do not consider that that would present an obstacle to the conveyance of passengers?—Not the least.

490. *Chairman.*] If the steamers were regular, and of sufficient capacity to take that cargo, do you think that there would be any freight for them to India?—It would take some time to divert it from its present channel; but eventually I have no doubt that they would receive a large amount.

491. What is its present channel?—It is in the hands of natives, who would view our interference with great jealousy.

492. You mean that there is a traffic, but that the article would still go in the native vessels, instead of in the steamer?—Exactly.

493. Lord *Sandon.*] Do you suppose that the pilgrims would make use of the steamers?—The rich pilgrims would, I have no doubt, in a short time.

Lunæ, 26° *die Junii*, 1837.

MEMBERS PRESENT.

Mr. Bagshaw.
Lord William Bentinck.
Mr. Crawford.
Mr. Robert Gordon.
Sir J. Hobhouse.
Mr. Mullins.
Lord Viscount Sandon.
Mr. Williams Wynn.
Mr. G. F. Young.

LORD WILLIAM BENTINCK, IN THE CHAIR.

Thomas Love Peacock, Esq. called in; and Examined.

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494. *Chairman.*] WHAT are you?—I am Examiner of India Correspondence.

495. You are particularly conversant with the subject of steam navigation to India?—I have paid a good deal of attention to it.

496. You were examined in 1834?—Yes, and in 1832.

497. You then gave it as your opinion, that for carrying into effect the communication with the Red Sea by steam, four vessels of 200-horse power, with a proportionate tonnage of three to one, would be required?—The proportion of tonnage to power.

498. That is, with Bombay?—With Bombay, I think that is rather too few than too many.

499. You gave that as your opinion then?—Yes.

500. Do you think any additional number will be necessary, or does your opinion remain the same upon that point?—I think it would be better to have five, and for these reasons: I find that the Mediterranean packets, at the time I looked at the establishment last, which is some time ago, however, but I believe it is the same now, required four to carry on the communication with Corfu. The vessel that left Falmouth on the 1st of January left it again on the 1st of May, and in the same order on the 1st of February and the 1st of June. That is about 16,000 nautic miles; three voyages in the year to Malta, Corfu and back. Of course those four vessels amongst them, performed in the year 64,000 miles. Now, the 12 voyages from Bombay to Suez and back are 72,000 nautic miles, and considering the great superiority of the means of repair which the Mediterranean packets have to those which the Indian steam vessels can possibly have, I should think that 16,000 miles a year would be the maximum of the possibility of their performance, one year with another, for any length of time each. Therefore, less than five steamers would scarcely perform the work. I find also that the great Scotch steam packets, which are vessels of great power, which run about two days of every week, and rest five, coming at each end of their voyage into a port of repair after every run of between 400 and 500 miles, perform only one run each way in the week, which is somewhat more; it is between 20,000 and 25,000 miles in the year, that is the maximum of their performance; but I think it cannot be taken as the basis of calculation for a long sea voyage; the Mediterranean packets are the only guides that we have as yet to go by. Besides, Captain Wilson has given it as his opinion to the Bombay government, that the Hugh Lindsay packet is only equal to two Red Sea voyages in the year, that is, 12,000 miles. It will, therefore, require six Hugh Lindsays to carry on the voyage between Bombay and Suez.

501. Lord Viscount *Sandon.*] The Hugh Lindsay is not the standard to go by?—That is the only vessel the Indian government have, to which they can say, Go to a certain point and come back; she is the only vessel that has been able to do that. She is a very strong vessel, well built, and has very great power, which is the only great advantage she has; she was only built to carry five days' coal, and she has carried 10 or 12.

502. *Chairman.*] Would you propose that each of these vessels should make the voyage out and home, or be relieved in the Red Sea?—There is an advantage in

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changing the vessel, provided it can be done in a port of repair, but not otherwise; but if it were relieved in the Red Sea, I should think it should be relieved by a vessel of precisely the same tonnage and power.

503. I suppose you would be of opinion that all the vessels should be of exactly the same tonnage and power, exact copies of each other?—Yes, exact copies of each other.

504. That all the machinery should be the same?—Yes.

505. And suit each other?—Yes; there would be a great advantage in having one vessel quite cool and clean, and ready loaded with coal, to start immediately on the other's arrival.

506. Lord Viscount *Sandon.*] Supposing no goods were carried?—Yes; and the passengers' luggage would be very small, and they would go into precisely the same cabins, they being precisely the same vessels; but if they go out of such a vessel as the Berenice into such a vessel as the Hugh Lindsay, they will not find the same accommodation, nor any accommodation for the same number of persons.

507. I think, in making the inquiry, we must assume that all the vessels are of the same power, and equal to the best of the two vessels that were first sent out?—Yes; the best of the two vessels that were sent out was not too good for any part of that voyage.

508. *Chairman.*] You had better now explain what the powers of the best of the two vessels are?—I will state both of them. The contracts were made for vessels of not less than 600 tons measurement, and not less than 200-horse power; that is to say, having cylinders of not less than 54 inches diameter. The Atalanta was built by Messrs. Wigram and Green, in the river Thames, exactly, I may say, according to the contract, which was made for 616 tons measurement; the old measurement. And the engines, which were made by Messrs. Maudeslay, had cylinders of exactly 54 inches diameter, with five feet stroke. The Berenice has about 50 or 60 tons measurement more than the contract, and two inches diameter of cylinder more than the contract; therefore, speaking in round numbers, the Atalanta may be said to be a vessel of 620 tons, and 210 horse power; and the Berenice, of 680 tons, and 230 horse power. These vessels were to have been ready for sailing in July 1836, by which it was expected they would have the advantage of the south-west monsoon, on the other side of the Cape. They were, however, not ready till six months later, but as soon as they were respectively ready they were dispatched. The computation which was made of their voyages was, that they would reach Bombay in 59 days' steaming; the total distance was taken in round numbers at 12,000 nautic miles, the actual distance of their run being 11,500. The consumption of coal was calculated at 20 tons a day, and the daily run was taken at 200 miles.

509. Lord Viscount *Sandon.*] In 24 hours?—In 24 hours.

510. *Chairman.*] Do you mean the average daily run?—Yes; it was taken at that; 12,000 miles would be the run in 60 days, and being 11,500, we allowed 59 days. The coal sent direct was Llangennech coal, selected in very large pieces, the dust of Welch coal being good for nothing. The stations chosen were Teneriffe, Mayo in the Cape de Verd Islands, Fernando Po, the Cape of Good Hope, the Mauritius and Cochin. Mayo was chosen after a good deal of inquiry respecting the best station in the Cape de Verd Islands, and there seemed to have been no very good one; that appeared to be the best; but after the arrangement had been made, we found reason to believe that the Isle of St. Vincent would be the best station in all that part of the world for a steam vessel.

511. Lord Viscount *Sandon.*] Is that one of the Cape de Verd Islands?—It is the only island that has anything that may be called a harbour; all the rest are roadsteads. The time of detention could not be well estimated, the coal being sent to places almost entirely new to us. We set it down, however, at 16 days and a half, which turned out to be much too little, the detention being much greater. The average run which I mentioned calculated to the Cape was 34 days. The actual run of the Atalanta, the actual steaming was 35, and therefore we were only out one day in our reckoning.

512. Did she steam all the way?—She steamed all the way; she made about 210 or 220 miles on an average to Fernando Po, and from Fernando Po to the Cape she averaged 160; she steamed the whole of that long run against the south-

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east trade wind, which we had expected to avoid by sending her round to the coast of Africa. We sent her to Fernando Po out of the way, in order that she might avoid the south-east trade wind, but as she did not succeed in doing that, I should certainly recommend any other experiment that might be made by the Cape route to be made by St. Helena direct.

513. That is a shorter course?—A much shorter course, and I should have no doubt of the capacity of either of these vessels to have run against the south-east trade wind the whole of that line.

514. *Chairman.*] Then she went seven knots an hour against the south-east wind?—Yes.

515. Was it blowing hard; does it appear by the log that it was blowing hard?—Sometimes there were strong fresh breezes; a strong head-wind.

516. Is there anything said about the swell?—No; the captain speaks of the current; he says he met with a very strong adverse current. The run from Fernando Po to the Cape is in round numbers 2,400 nautical miles, and is the greatest run that has ever yet been made by a steam vessel at sea.

517. How many days was she doing that?—Fourteen. The Berenice we have only heard of from Mayo, one of the Cape de Verd Islands; it is just beyond St. Jago, between St. Jago and the main land.

518. How far is that?—These are the distances; Falmouth to Teneriffe, 1,400 miles; Teneriffe to Mayo, 860; Mayo to Fernando Po, 2,009; Fernando Po to the Cape, 2,355; the Cape to the Mauritius, 2,271; the Mauritius to Cochin, 2,125; Cochin to Bombay, 575; total, 11,581.

519. Her first stage was 1,400 miles?—Yes.

520. How long was she doing that?—Seven days.

521. Did she take in coals then?—She took in coals at Teneriffe. She had met with a storm in the Bay of Biscay which damaged her upper works, and she staid there for repair; she was there about a week.

522. What was her consumption of coals for each day, do you know; or how many days' coals did she take?—She took 250 tons.

523. Lord Viscount *Sandon.*] That would be 20 tons a day?—Yes; but she did not consume so much; that quantity was allowed for wasteage and for accidents; her consumption of coal was less than that of any steam vessel of which we have any knowledge; it was less than seven pounds per horse power per hour; eight is considered very little; ten or twelve is very common.

524. *Chairman.*] Can you account for that?—I can account for it from two causes; first, from what I believe to be the superiority of the boilers made by Maudeslay to any other boilers whatever: They have some art of economising fuel; they make boilers smaller than others, but more effective: And secondly, to the great pains that were taken in the selection of the Llangennech coal. The Atalanta had 20 tons of coal left when she arrived at the Cape, so that her power was more than 2,400 miles against the wind.

525. Lord Viscount *Sandon.*] Had she this wind pretty nearly the whole way?—South pretty nearly the whole way, as I see by the log, south and south-east.

526. *Chairman.*] You did not expect that?—No; the captain himself was very doubtful about the result: for he says in a sort of private diary, of which he sent me a copy, "I am exceedingly doubtful about my coals for this run;" at the end of every day he records his feelings and expectations, as to the chance of his coal lasting to the Cape.

527. These two vessels were built originally as war-steamers, were they not; not as packets?—There was some misunderstanding on that subject; the vessels were built originally as the result of an arrangement between the President of the Board, which was Lord Ellenborough, and the Chairman of the Court of Directors; there was at that time, and there has been, as is well known, a negotiation pending between the Court and the King's Government respecting the division of the expense. It was always the basis the Court took, that they would act on the recommendation of the Parliamentary Committee. These vessels were to be built in anticipation of that arrangement, or in case of that arrangement coming to nothing, that they should be serviceable as war-steamers in the Persian Gulf.

528. Lord Viscount *Sandon.*] To be convertible?—To be convertible, but it appeared so exceedingly probable that they would be employed as packets, that they were constructed very much with a view to being serviceable as packets,

and at the same time to render them as efficient as possible as vessels of war. If they had been built exclusively as vessels of war, they would certainly not have been built with rising decks; but being built with a view to the ultimate accommodation of passengers, the rising decks appeared indispensable; therefore it was an attempt to reconcile two objects which were in a very great measure incongruous.

529. *Chairman.*] But I suppose as packets they are well adapted for the purpose?—As packets, nothing can be better.

530. What number of passengers will they accommodate?—There are nine cabins, very good ones. The captains were allowed to take passengers on their own account; the Company did not wish or expect to derive any advantage from that source: but the passengers were limited to 18 persons in all, servants included. The number I believe they both took; the Atalanta certainly took that number, and the Berenice likewise, I think.

531. And is that the extent that you would say these vessels would carry between Bombay and Suez?—It depends on the accommodation people would put up with. The accommodation is about equal to that of the Dundee and Perth Scotch steamers, which carry between 100 and 200 passengers, if they choose to sleep on the sofas in the saloon.

532. Lord Viscount *Sandon.*] When they were full of coal, what room had they besides for cargo?—No room for cargo; cargo never entered into speculation.

533. *Chairman.*] Could you form some estimate of the number that could be conveniently carried in these vessels?—There are nine cabins, each of which will accommodate two persons, I should think not more, not with any comfort.

534. And is there a large dining-room or cuddy in which people could hang up?—Most beautiful rooms they are.

535. Lord Viscount *Sandon.*] There would be room for light cargoes, would there not, besides the coals?—For treasure or articles of great value and small bulk; these vessels carried out treasure; the Atalanta carried a great deal upon the captain's account, and upon his own responsibility.

536. Mr. *Crawford.*] Articles of great value and small bulk were carried to the Isle of France?—They were carried to the Cape also. There was a great deal carried to the Isle of France.

537. *Chairman.*] But there is no room properly for cargo in these vessels?—No; cargo was left out of view. If you made a short run and took 100 tons of coals, you would take 150 tons of cargo. The Berenice would carry more coals than the Atalanta, and she requires more.

538. Lord Viscount *Sandon.*] If she had not had head-winds between Fernando Po and the Cape of Good Hope, she would have had a great deal of spare coal?—Yes, a great deal; she had at other stations spare coal, in fact the Berenice did not find it necessary to stay at Teneriffe at all. The captain ran in there, it was Good Friday, and he said he found the Spaniards all in a state of insanity, beating the image of Judas Iscariot with cudgels, and refusing to do anything, and therefore, as he found he should be detained many days, he went on to Mayo, having coals enough to carry him there, and to have some left still.

539. *Chairman.*] Then you consider five vessels necessary?—Yes.

540. Of course the same establishment of five vessels would carry the communication to Point de Galle and to Bombay?—That is a greater distance rather. I think not material, the same would do.

541. Well then, I will ask you how many more steamers would be requisite to carry on to Calcutta from Point de Galle, or between Point de Galle and Calcutta?—I would allow one steamer for every 15,000 miles. The distance from Point de Galle to Calcutta is 1,170 miles: in round numbers we will call it 1,200: one steamer would about do that, one running one way and one the other; it would require two from Point de Galle to Calcutta. A steamer will last much longer if not overworked. It could do more than 15,000 miles, but it is not advisable that it should.

542. Then the extra expense will be two steamers?—Two steamers to Calcutta.

543. Supposing you go to Calcutta instead of Bombay, it will require two additional steamers?—Yes.

544. Now we will have the expense of these vessels; in your former examination,

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nation, you estimated the expense of each vessel very much of the same tonnage and power?—Yes; 600 and 200.

545. You estimated the annual expense of each vessel at 25,000 *l.*?—Yes, I did.

546. That is, taking in all expenses, I suppose?—Taking all expenses, including the sinking fund for building the vessel and replacing it when it is worn out.

547. Mr. *Crawford.*] All expenses to keep a steam vessel at all times efficient?—Yes.

548. *Chairman.*] But that was also on the understanding that it was done in the most economical manner?—Yes; and I gave the reasons.

549. Before you go to that, I will just ask you if your present estimate is the same; do you think the expense now would be the same?—I do not see any reason to make any material difference in that estimate.

550. You further say, that in India you think it would be double that expense, I think you stated that?—Yes; I spoke of that in round numbers.

551. That is, 50,000 *l.* a year for each vessel?—All the outlay, (for the fuel, the establishment, and everything of that kind,) is all Indian; I only said the prime cost of vessels built in India would be about double the expense of vessels built in England.

552. Lord Viscount *Sandon.*] The prime cost?—Yes; and there was another point, if the fuel was supplied from India to the Red Sea, instead of direct from England to the Red Sea, I think that expense would be double. If it went to India first, and then to the Red Sea, I think it would be double to what it would be if it were sent from England to the Red Sea, not merely on account of the additional freight, but also on account of the deterioration and waste.

553. Mr. *Wynn.*] Do you not allow for any supply of India fuel?—Not of native fuel.

554. Only that which has been tried sufficiently and succeeded?—The Burdwan coal: that must be sent round from Calcutta, but it is not above half the power of the Llangennech coal, and the freight from Calcutta must always be very great. I have seen it stated in the Indian papers (I know nothing of it officially) that 50 rupees a ton was paid for freight from Calcutta to Mocha, for Burdwan coal; there is only the Burdwan coal that is available from India.

555. You consider the Burdwan coal the only coal that has been discovered in India, which is available for the purposes of navigation?—Yes.

556. Mr. *Crawford.*] Do you know anything with reference to what it may cost to be brought to Calcutta from Burdwan?—I do not know exactly, but it is very cheap.

557. Mr. *Mullins.*] What do you think would be the probable cost of fuel in India, in places where it may be taken in ballast?—They will only take it in ballast from their own ports of loading: the Liverpool vessels will only take Lancashire coal; Lancashire coal does very well to run from Liverpool to Ireland, or any part of the continent of Europe, but it does not do for a long sea voyage, which is the thing you have in view.

558. Therefore Llangennech is the only coal you seem to approve of?—It is the only coal that combines sufficient power in the bulk that any of our steamers can carry, or any steamers I know, to run the distance the Atalanta has run.

559. Lord Viscount *Sandon.*] Would not the Burdwan coal do for the run between Suez and Mocha?—Yes, it would do for that distance.

560. That is the same as the communication between Liverpool and Alexandria?—Yes; but the freight would be greater; and you will send out less combustible power in the same bulk. What you want is combustible power; I doubt if a Liverpool vessel would take it to Mocha; I should think any coal going that way would be ground into powder; there is landing and loading it on camels' backs, and trotting across the desert, and depositing the fuel, and putting it again into the steamer; and if anything but dust got into the steamer I should be very much surprised.

561. It could not be laid down at Suez for less than 6 *l.* a ton, I suppose?—I do not see the necessity for coals at Suez at all, except in cases of emergency; it would be much better to have a port two-thirds up the Red Sea, and then let the steam vessel run from that to Suez and back, it would be much cheaper. It would be much better to let the Atalanta and Berenice run up the whole length

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of the Red Sea and back again without taking in any coal at Suez; only having a small depôt for emergency.

562. Mr. *Mullins.*] But you think it probable that certain vessels may take Llangennech coal in ballast?—The only difficulty is to get them to the port of loading.

563. Assuming them to take out Llangennech coal in ballast, what do you suppose would be the cost in India per ton?—I should think they would not take coal in any quantity for less than 20 *s.* as ballast or dead weight, or whatever it may be called. We have had it done for 9 *s.*, but I should think as a general arrangement it could not require less than 20 *s.*

564. What do you suppose would be the extra cost of conveying that coal from any one of the Indian ports to the different depôts in the Red Sea?—That is exceedingly variable.

565. Take Socotra for instance?—I do not think it makes much difference whether you take it at Socotra or Mocha; but that I have not the means of knowing; we have not official accounts clear enough; but as I have already said, it cost 50 rupees a ton from Calcutta to Mocha; moreover, we know that the coals of the Hugh Lindsay cost 5,000 *l.* each voyage, a very great part of which must have been freight; but we have not the means of making official returns of the exact rate of the freight of coal from Bombay to the Red Sea.

566. Do not you think if there was an establishment of regular steam communication with the different ports in India, that the price of coals would diminish?—I should think it would rather increase.

567. On what principle?—Because the spare freight, which is the only freight worth reckoning upon, is limited; there was a great deal of evidence to that effect respecting the available dead-weight tonnage before the Salt Committee; the result of that was, that they could go from Liverpool (and when it was examined I think it was proved they had not so much to spare, but that was their statement,) with 10,000 tons in the year, at 20 *s.* a ton; but on examining the quantity of tonnage, the total amount of tonnage from Liverpool of all kinds, it does not appear that the dead-weight tonnage bore that proportion to it.

568. Lord Viscount *Sandon.*] The demand for the whole of that tonnage would naturally raise the price of freight?—Yes; but then the freight is a very small part of the charge; the landing and the re-shipping are very enormous charges. We had a charge of 1,967 dollars on one landing and re-shipment, at Aden. It could not have been above 100 tons. The landing and the re-shipment of the coals in the stations which we have employed for the Cape voyages, and where it is likely to be very much cheaper, much more easily managed at any rate than in the Red Sea stations, has been about 20 *s.* a ton.

569. (*Chairman.*] But of course that would be prevented hereafter?—All that admits of remedy, but though the coals have cost 7 *l.* a ton, I think if we assume by good management we could get it for 3 *l.* 10 *s.*, it is as little as we should be able to get it at.

570. Have you had any communication with Colonel Campbell on this subject?—No; not much communication from him.

571. You have had no communication with him about coals?—The only communication received from him lately is, that the Bombay government had written to the Pacha of Egypt to allow them to make Camaran a coal depôt, and that the Pacha had acceded to the request. Camaran, I presume, is a very much better station than Mocha; Mocha in fact will not do for these steamers, because Captain Wilson says, no vessel drawing more than 10 ½ feet of water can go into the inner anchorage at Mocha; and the outer anchorage is exposed to so great a swell during a very great part of the year, that the taking coals on board is a matter of great difficulty, and often impossibility.

572. Lord Viscount *Sandon.*] What is the draught of these vessels?—About 14 or 15 feet; 16 the Atalanta's, when quite full, but she has one (which does not properly belong to her depth) she has one foot under her bottom, which is called a hollow garboard. She had too little beam, for which this was adopted as a remedy.

573. *Chairman.*] If the steamers from Calcutta could be worked with the Burdwan coal, the expense of working them would not be so great?—No.

574. Mr. *Mullins.*] Should you think it advisable to limit the tonnage of any future vessels to be built to the tonnage of the Atalanta or the Berenice, and the horse power?—No; I think the larger a steam vessel is, the more work she

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will do, and the more economically she will do it; I have not the least doubt that 160-horse power will consume as much coal as a 200-horse power, for if you take it in round numbers at 20 tons a day, which is one ton for 10-horse power, and if a 160 power vessel will go 160 miles, and a 200 power vessel will go 200 miles, it is very clear the consumption per day is the same, and the time is lost, and this, though I state it theoretically, is a matter of fact proved by experience.

575. You are aware it has been recommended to have the tonnage of vessels so high as 1,000 tons and 250-horse power, should you think it well to have them so large as that?—I should think a 1,000 tons vessel ought to have more than 250-horse power; that is only one to four, that is too little.

576. How much more?—One to three and a half on every 1,000 tons; from one to three, between 1,000 and 700, and on anything below 700 to 2½.

577. Do you suppose vessels of such a size could, without overloading, afford space for a certain number of tons for cargo as well as fuel and passengers?—Certainly; I do think they could.

578. To what extent do you suppose?—Not to a very great extent; to the extent of 100 or 200 tons perhaps.

579. Should you think so much as that?—One hundred tons, I should say, certainly they could; if you limit the run to such runs as the Berenice and the Atalanta take, and if, instead of the proportion of one to three, you have a proportion of one to three and a half, you will gain half the additional quantity.

580. What number of passengers do you suppose a vessel of 1,000 tons could conveniently and with comfort to themselves accommodate?—I do not think she could accommodate a very great number in any case; probably she might carry double the number of the Atalanta, 36 persons in all comfortably, but I do not think she could do more than that.

581. And independent of their luggage you suppose there would be 100 tons to spare for cargo?—Yes; in a vessel of 1,000 tons measurement, and the proportion of one to three and a half horse power for tonnage.

582. You are also of opinion that a vessel of a larger horse power and larger tonnage will not be so liable to wear and tear as a smaller vessel?—Certainly, up to a certain extent.

583. *Chairman.*] You have estimated the annual expense of each vessel at 25,000 *l.*?—Yes.

584. You have done it in the most economical manner?—Yes, built in England and the coals sent from England; but I certainly was in hopes that our building the vessels in England would stimulate the Indian government to carry on their own operations more economically, and pay more attention to them.

585. I have always understood they can build in Calcutta as cheap as in England, and that it is the repairs that cost so much more?—We have not found that by experience; the repairs of the Enterprise cost more than a new vessel would have done; the Hugh Lindsay cost more than the Berenice.

586. At Bombay?—Yes.

587. Mr. *Young.*] Can you give the Committee any information as to the relative expense of building a vessel at Calcutta and in England?—No, not in all its technical details.

588. The price per ton at which they contract to build ships?—No; they say they can build them cheaper than we can build them in England.

589. Lord Viscount *Sandon.*] Do you happen to know at what rate per ton vessels are generally built at Bombay or Calcutta, putting steam vessels aside for the moment?—No, I do not; I only look to the general fact, that some steam vessels of the same size, including engines and so on, cost more building there than here.

590. *Chairman.*] Which was the highest contract for the Berenice or the Atalanta?—It was the same as nearly as possible; there was this difference, the Atalanta was contracted for (the vessel) with Messrs. Wigram & Green, and the engines with Messrs. Maudeslay & Field, and the aggregate amount of the contract was somewhat less than 29,000 *l.* The Berenice was contracted for with Mr. Robert Napier, and the aggregate amount of the contract was 29,000 *l.* exactly.

591. Mr. *Young.*] What were the respective amounts of the ship-builder's and the engineer's accounts for the Atalanta?—The engines of the Atalanta were 15,000 *l.*, and duplicate mechanical stores 1,300 *l.*; the hull would be about the

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difference. It was 28,800 *l.*; that made up the aggregate; if you deduct those two sums you will have the hull within a few pounds.

592. That is 12,500 *l.*?—That is as near it as possible.

593. What was the tonnage of the Atalanta?—Six hundred and sixteen tons.

594. *Chairman.*] How much would that be per ton?—Twenty pounds per ton; that included more than the hull; it included a good many things.

595. Mr. *Young.*] The entire cost of 28,800 *l.*, I presume, included the whole of the sea equipment, masts, yards, sails, anchors and other stores?—Yes, the whole; it included the complete sea equipment.

596. Mr. *Mullins.*] I find it stated by Dr. Lardner, that a vessel of 1,000 tons and 250-horse power can be constructed in any of the outports for 30,000 *l.*, does that agree with your opinion?—Yes; with iron boilers, and built by public advertisement for competition, it could be constructed for that or less.

597. You are of opinion it would be extremely improper to use iron boilers in vessels intended for long voyages?—Yes.

598. Mr. *Young.*] For what reason?—The copper boilers last longer, and the longer you can keep any part of the machinery of a vessel undisturbed the better.

599. Mr. *Mullins.*] Is there no other reason that you can assign for giving a preference to copper boilers over iron ones?—Nothing but their duration; I do not attach much importance to anything else.

600. You are not aware that they are less liable to injury?—No, I am not aware of that.

601. You have not turned your attention to that?—Yes, I have turned my attention to that.

602. Mr. *Young.*] Are you acquainted with the use of Hall's patent condensers?—I have paid a little attention to it; among practical men there are two opinions respecting them.

603. Have you ever seen the Hercules?—No; but I intend to see her when she comes here.

604. If it were proved to you that the water that was placed in those boilers nine months before, remains the same water, having been in constant use, without that being fresh water, and consequently free from any of that adhesion of saline particles which cause the destruction of iron boilers, would it not induce you to consider they were more advantageous than you now imagine them to be?—So far I believe it is proved that they would be advantageous, but there is greater weight and greater complication; I know as a matter of fact, though I do not know why, that the General Steam Navigation Company had them in one of their vessels, and took them out again. I know that as a matter of fact, but I do not know why.

605. Mr. *Mullins.*] Are you acquainted with Collier's patent boiler?—I have seen drawings of it. That is another complicated system.

606. So complicated, do you think, as to render it inexpedient to adopt it?—I think it would be inexpedient for the East India Company to adopt it, until it was tried in stations where the means of repair were more available.

607. Have you heard among scientific men any opinions injurious to the patent boiler I speak of?—No.

608. Have you ever heard any opinions in favour of it?—No; I have heard very little about Collier's. I do not know anywhere where it has been tried. I know where Hall's has been tried, and learnt some results about it; but I do not know anywhere where Collier's boiler has been tried; I have not had the means of getting information about it.

609. Mr. *Young.*] Are you acquainted with the principle of Hall's condensers? —Yes.

610. Mr. *Crawford.*] But in point of fact you would not recommend any experimental inventions with regard to steamers for India?—No.

611. I mean those which have not received decided approbation here?—No: the finest theory is Howard's vapour engine; that has succeeded to a certain extent.

612. *Chairman.*] What is your opinion of Socotra as a depôt?—In the first place I do not see that we want it all; I am only speaking from memory, because it is some time since I read the papers respecting it; but the general impression I have is this: that it has no harbour, but two good roadsteads; one available for the north-east and the other for the south-west monsoon; that it was taken possession of and abandoned in a hurry, upon the supposition that it was very unhealthy, and that supposition was afterwards supposed to have been too hastily

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hastily adopted; still, as it has only open roadsteads, I should doubt its being a good depôt under any circumstances.

613. You do not know that it is not?—No.

614. The fact is, you do not know whether it is or not a good depôt?—I know it has only open roadsteads; it may be a very good depôt.

615. However, you cannot speak to the fact?—I would not venture to say it is.

616. You do not know it is not?—I do not know it is not, but my impression is not favourable to Socotra.

617. What are proper depôts between Suez and India?—The best depôt, in my opinion, is the Island of Perim, in the Straits of Babelmandeb.

618. Mr. *Mullins.*] Do you speak from personal knowledge as to its eligibility?—I speak from the evidence given before the last Steam Committee in 1834, and from what I have seen on the Indian records.

619. Can those records be obtained that you speak of?—Yes; they are all to the same effect as in the evidence given before the Steam Committee in 1834.

620. Are there are any additional ones that have not been produced?—No; I think nothing more than that evidence is sufficient to enable the Committee to form a judgment on the island of Perim. The next best, I think, is the island of Camaran.

621. Mr. *Bagshaw.*] You do not speak of these things of your own knowledge?—Only from having studied them; and I wish it to be distinctly understood that any opinions I express are my opinions, and not those of the Court of Directors; I have expressed one or two already, which are at variance with the plan they have adopted; Mocha I consider to be decidedly bad, for the reason I gave, that it has not sufficient depth of water.

622. Mr. *Mullins.*] Why do you think Socotra could be dispensed with?—I conceive that either the Atalanta or the Berenice can run in the north-east monsoon to Perim or to Camaran. But I conceive that in the south-west monsoon, if it has not been very greatly misrepresented, they could not run to Socotra.

623. Do you think it would be advisable, under any circumstances, that those vessels, or larger vessels, should run so long a course when there was a possibility of their taking a shorter one?—I think it would be better that they should run to some very good and available station. The difference is not so very material in the north-east monsoon between Socotra and Perim as to make the difference between the two a distance of any consequence.

624. Have you any idea what the distance is?—It is about 600 miles, I think.

625. And to Socotra 200 miles further?—No; I say from Socotra to Perim is 600, but Camaran is near 200 miles further, 165 nautical miles.

626. Then, supposing it was shown that Socotra was a good depôt, and not liable to any of those objections which you seem to allude to, should you not think it more advisable to use Socotra for a depôt than to advance further to Perim or to Camaran?—Yes; I think it is not desirable to have long runs if it can be avoided; at the same time, long runs save time, provided they do not overwork the vessel in the time.

627. Then you think it would be better to lose a little time than overwork a vessel, and thereby create additional expense?—Certainly.

628. And the necessity of laying her up oftener than under other circumstances would be necessary?—Yes. There is abundant depth of water in Perim; it is a perfect harbour.

629. *Chairman.*] Is there not some difficulty in getting into it?—Not for a steamer, there can be none.

630. Does not the wind blow very hard there?—The wind blows very hard at the entrance, but I should not think that would affect a steamer in a narrow sea. I have another objection to Socotra for the south-west monsoon, and that is, that it is too far to the north; you will find in all the evidence that was given before the Committee in 1834, respecting sailing vessels that have gone to the Red Sea in the south-west monsoon, that they kept as close as possible round Cape Guardafui. Now a steam vessel leaving Socotra would be out in all the force of the wind, and would have either to run to the coast of Africa under very disadvantageous circumstances, for first she would go to Socotra and then back to the African coast. or else she must go right against a head-wind all the nsoon I should think Socotra

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not an advisable station; for the north-east I dare say it would be a very good one.

631. Mr. *Mullins.*] But supposing it was only advisable to use it in the north-east monsoon, do not you think it would be better to have it for a depôt than to dispense with it altogether?—I think it would be better to have it most certainly, though I do not think it the best depôt you could choose, as far as I know, and I might alter that opinion on reading the papers over again, but yet I think it is most desirable to have it as a depôt; I think we could not have too many depôts, because it is only for depositing coals which would be used on an emergency, and experience would point out which was the best. The choice is evidently very limited; Socotra, Perim and Camaran are about the whole that are good.

632. *Chairman.*] Perim would be the first?—Perim has no water, it is a mere sandy rock, that is its disadvantage. But a very small establishment would be necessary, and I should think the steamers themselves could feed it.

633. The second would be Camaran?—Yes: but that being only 165 miles from Perim, it would not be necessary to have them both; but Perim appears to possess so many advantages in its position, and its harbour, and its distance, that I think it would be very desirable to try to form a small establishment there.

634. If it were thought necessary that we should possess Socotra, does there appear to be any difficulty in obtaining the cession of that land?—As far as I remember from the papers, none at all.

635. Well, now we will take the time: in 1834 there appeared to be a doubt whether the south-west monsoon could be overcome by steamers; I suppose there is no doubt any longer upon that point?—There is still a great deal of doubt among practical men on the subject, arising from the length of the run. I do not find many practical men very adventurous; the most adventurous men against stormy winds are the people of Liverpool and Glasgow; they do not make any doubt of the power of a steam vessel to surmount any opposition in the south-west monsoon; but they suppose the number of miles that a steamer could run against it in a day would be greater than she would be able to carry coals for to the first available station. The best chance of standing against the south-west monsoon would be, if it were possible to find a depôt, immediately round Guardafui. Now I do not know that there is not one; there is no evidence that there is not one. There is the island of Perim [*handing a chart to his Lordship*].

636. I suppose there is more sea-room than about Socotra?—Those who speak of the harbour in that evidence speak of it as being perfectly land-locked.

637. Is not this rather about a depôt than about the passage from Bombay, because I am now talking of the south-west monsoon?—Yes; but a depôt for the south-west monsoon should be, if possible, immediately round Cape Guardafui.

638. There was a doubt whether a steam vessel could successfully encounter the south-west monsoon dead an end; does that exist now?—It does not, provided you have vessels of great tonnage and power; you must have that; that is essential.

639. Are the Atalanta and the Berenice equal to it?—I think not; the Berenice might be, I am more doubtful about the Atalanta.

640. But supposing a communication from Bombay in the south-west monsoon, how would you make the passage, not being able to go dead an end; might you slant away to the southward?—You could not go more than six points; but I would make a course within six points of the wind; I would not run down to the Line, as some propose to do.

641. How far would you go in that direction, would you take in the strongest part of the south-west monsoon; what course would you take when you leave the Bombay harbour?—Some propose to run to the northward first, then to make a very long run to within two or three degrees of the Line. I would run out of the harbour and make courses, not very long ones, within six points of the wind.

642. Mr. *Crawford.*] Lines as near in a direct course as possible?—Yes.

643. *Chairman.*] Would you go exactly like a sailing ship?—Exactly so; or else I would go dead an end, which is what the Scotchmen would do. The Glasgow men would go right ahead against any wind that blows. The Atalanta has gone upon that principle, she went right ahead always.

644. Under those circumstances, what time would vessels take to go to Socotra?—From Bombay?

645. Yes, from Bombay?—They would be about 12 days, I should think.

646. Mr.

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646. Mr. *Young*.] What is the distance ?—Twelve hundred miles.

647. *Chairman*.] But that would bring the coals of one of these vessels very near to their total consumption ?—It would; but I think it would be possible to do it, if she could go five miles an hour, which is what I calculate. I think it would be possible, but I would rather run to Guardafui and have a depôt immediately round the point; there is an island there.

648. But the distance would not be less to that point ?—The distance would not be less.

649. Well now, would you take the other mode you have put, that other persons suggest ?—I would not take that plan at all of running to the northward, and then to the southward, and then along the Line, and then up to the northward again.

650. Mr. *Young*.] Though some have recommended it ?—Yes, some men of great experience; but I think the time it would take would frustrate all the objects of an expeditious communication. No doubt it is practicable.

651. But you consider the preferable course to be to have vessels adapted for encountering the severity of the monsoon, and then steaming as nearly as the circumstances in which you might be placed would permit ?—Certainly; with sufficient tonnage and power, if you do not exceed 1,000 tons' measurement, and 300-horse power within that limit, you might go against the south-west monsoon, that is my opinion.

652. *Chairman*.] Now it is 1,600 miles from Galle to Socotra ?—It is rather more than 1,600, very near 1,800.

653. And the passage, in point of wind, would be more favourable ?—Much more favourable, it would be almost a beam wind. If it were a true south-west wind, it would be a beam wind from Galle to Socotra; but it is not, it is more westerly.

654. How many knots an hour do you think the Atalanta and the Berenice would go under those circumstances ?—I should think they would go their usual rate.

655. Two hundred miles a day ?—Yes.

656. Then Galle to Socotra would take eight days and a half ?—Yes.

657. Well, now let us go from Galle to Calcutta and back; that is, I believe, we will stop at Madras ?—That is 540 to Madras, and 720 to Calcutta.

658. Mr. *Crawford*.] Now where do you start from, and which monsoon ?—The south-west monsoon.

659. *Chairman*.] There is much greater [illegible]ty in the bay of Bengal steaming against the south-west monsoon than in th[illegible]ian sea, because it does not blow home; by keeping near the shore you hav[illegible] the wind, only the swell against you ?—Yes.

660. Well now, from Calcutta to Galle against the south-west monsoon ?—Yes.

661. Mr. *Bagshaw*.] Let me ask whether, as you approach the African coast, the winds are not found to change more to the south than in the centre of the bay in the European sea ?—The winds are south very near the coast of Africa, below Guardafui; but beyond Guardafui they blow right up and down the Gulf of Aden. There is a due westerly wind in the Gulf of Aden, going south to Bombay; in the south-west monsoon the wind falls away.

662. Mr. *Young*.] Are you acquainted with the effects of the south-west monsoon on the navigation of the Bay of Bengal ?—I will state one circumstance; the Enterprise left Calcutta in the south-west monsoon, to go to Bombay, for the purpose of making the first voyage to the Red Sea; she got to Point de Galle, she could not round that point, and she went back to Calcutta.

663. What time did the Enterprise occupy in the performance of the passage from Calcutta to Point de Galle ?—That I cannot tell you; I only know that simple fact. You must have a powerful vessel to go round Point de Galle.

664. In what time do you consider a well-adapted steamer would be capable of making the passage from Calcutta to Point de Galle against the south-west monsoon ?—I think that under any favourable circumstances they will always make their 200 miles; and under decidedly adverse circumstances they will never make less than 150, excepting, as I said before, if the south-west monsoon has that tremendous power which is ascribed to it; through the whole distance I think they will not make less than 150 miles a day

665. Then I understand that under favourable circumstances you are of opinion

that the passage might be made in six or seven days, and under those unfavourable circumstances, in nine or ten; is that so?—Yes, certainly.

666. Mr. *Mullins.*] Now, looking to vessels of 1,000 tons, with 300-horse power, within what period do you think they would make the same passage?—I think a very large and powerful steamer would make 200 miles good under unfavourable circumstances; all but the most unfavourable. If you could get 150 miles a day against the south-west monsoon, then you would do well.

667. *Chairman.*] If it does not blow home?—No, I should think you might do that in the Bay of Bengal.

668. Then in the north-east monsoon?—That is nothing for a steam vessel.

669. What would you take as an average?—I would take 200 miles a day in the north-east monsoon.

670. Both sides 200 miles a day, backwards and forwards?—Yes.

671. Mr. *Young.*] What time do you imagine is occupied in taking in coals at Point de Galle?—I do not know; we have been very much out in the calculation of the time occupied in taking in coals. These steamers will not round the Cape, the detention is very great; but the best plan would be to have moderately long runs, and to change the steamer at every station.

672. Suppose the Atalanta or the Berenice to be dispatched from Calcutta, what are the stations that you would recommend for taking in coals during the south-west monsoon?—Under any circumstances they would run down to Point de Galle. I do not see any necessity for having anything nearer than that, and that you must have.

673. That you have already calculated as occupying upon an average eight days?—Yes.

674. How long would you give a vessel at Point de Galle for taking in a fresh supply of coals?—I am not sufficiently acquainted with the capacities of Point de Galle to say that; we have always been mistaken in our reckoning in point of time.

675. But from the best information you have?—Five days; but I would save those five days by having another vessel ready.

676. We have understood you, then, I think, to express it as your opinion that from Point de Galle to Socotra might be accomplished in eight days more?—Yes; but I will say to Guardafui; I would rather run there than to Socotra in the south-west monsoon; I wish to keep that in view, if a dépôt can be found. If you touch at Madras you may have coals there, if you want them, but you do not want them; and you cannot always touch at Madras.

677. Then it appears, if I understand you correctly, as the result of your estimate, that during the prevalence of the south-west monsoon a passage might be made from Calcutta to Guardafui or Socotra in about the same time as you calculate it would occupy to make a passage from Bombay to those same points; is it so?—No, I think not.

678. Did I understand you correctly that it would occupy 16 days from Bombay to Guardafui or Socotra steaming in the south-west monsoon?—What I should say, and what I meant to say is, I should think a vessel would go against the south-west monsoon from Bombay to Guardafui at the rate of 120 miles a day, and from Point de Galle to Gaurdafui at the rate of 160 miles.

679. From Bombay to Guardafui is what distance?—One thousand two hundred miles. If you take 1,760 miles at 160 miles a day, that is 11 days, I think they could go from Point de Galle to Socotra in 11 days; then take 1,200 miles, at 120 miles a day, from Bombay to Socotra, I have always understood it to be 1,200; but I am speaking of nautical miles, which are not always adhered to.

680. But you are speaking of them in all instances?—Yes; when I speak of land distance I speak of nautical miles also. It is not more than 10 days, at 120 miles a day. Socotra was always stated in the Indian papers, when there was so much discussion about it, as being 1,800 miles from Point de Galle.

681. What period would be occupied by one of the vessels you before adverted to in making a passage from Calcutta to Madras during the south-west monsoon?—Four days, I should think.

682. And what from Madras to Galle?—I should think it would be about the

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same, about five days; about five or six days. I should think it would take ten days the whole passage.

683. It would seem to follow then, from the evidence you have now given, that the time that would be occupied in passing from Calcutta to Socotra would be 21 days during the south-west monsoon, exclusive of any time that might be lost in taking in coals at Galle, or detention at Madras?—Yes.

684. *Chairman.*] What is the time occupied from Bombay to Calcutta by Dauk?—Ten days, sometimes 12 and sometimes 14; I am speaking of the shortest time when I say 10 days.

685. Of course, during the rains it would take a great deal more?—A great deal more; yes.

686. Mr. *Young.*] Then 21 days being occupied from Calcutta to Madras, and from Galle to Socotra, it appears that it would take about the same time if letters were dispatched overland from Calcutta to Bombay, and from thence forwarded to Socotra in the south-west monsoon?—It would, I suppose.

687. But in the return, you would have great advantage on the Bombay side?—Yes; and in the north-east monsoon you would have great advantage.

688. During the prevalence of the north-east monsoon, what time do you think would be occupied in passing from Socotra or Guardafui to Bombay?—Two hundred miles a day. I have no doubt they could run that. I have not the least doubt of their running that.

689. That would be six days then?—Yes, six days to Bombay, and nine days to Galle.

690. And from Galle to the Bay of Bengal, during the north-east monsoon to Madras?—It would only make 90 miles difference for the deviation. From Galle to Madras is 540 miles; three days would be enough to allow for that.

691. And from Madras to Calcutta?—That is 720; four days, I think that is allowing quite enough.

692. That would be 16 days to Calcutta, by Galle and Madras?—From Socotra, yes.

693. Mr. *Crawford.*] Without detentions?—Without detentions.

694. Mr. *Young.*] And by Bombay you would, I presume, add the 10 or 12 days for the passage overland to the six?—Ten days you must allow.

695. How long is the average communication by land?—The shortest possible communication is eight days.

696. What period would you add to the passage from Socotra to Bombay, for the transmission of letters from Bombay to Calcutta, during the north-east monsoon?—About 11 days; I would take one day to get them ready, and ten to send them.

697. Then letters would, in your opinion, be conveyed from Socotra to Calcutta by Bombay in 15 days?—Yes; but it might be done in eight.

698. What do you think would be a fair average calculation?—If it were worth while to run a race, I should say it might be done in eight days.

699. Under ordinary circumstances, would 10 days be proper?—Yes.

700. Then it would occupy 16 days by Bombay?—Yes.

701. And by your former statement, if taken by Galle and Madras it would occupy, I understand you to say, nine and three are 12 and four are 16?—Yes.

702. Which is the same time with the addition of any time that might be lost in stopping either at Madras or Galle?—And exclusive of relays.

703. Mr. *Bagshaw.*] I wish to call the attention of the witness to the situation of Madras; the time it takes to convey letters from Socotra in the north-east monsoon to Bombay is six days by a steamer; now what is the time it takes to convey letters by dauk from Bombay to Madras?—I cannot speak to that exactly, but I should think it would not take more than to Calcutta.

704. Then in fact that would be 16 days to Madras?—Yes.

705. Then by steam all the way from Socotra by way of Galle to Calcutta, according to your former statement, it would only take twelve days?—Yes.

706. Then there would be a saving in time to Madras of four days?—There would.

707. Mr. *Young.*] In your preceding evidence, referring to the transmission of letters overland from Bombay to Calcutta during the prevalence of the south-west monsoon, you stated that it would take 10 days?—I do not remember that I stated that; I think that is too little.

708. Do

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708. Do not the rains prevail during the period of the south-west monsoon? —Yes; part of the road must be almost impassable. There must be a detention, or a deviation.

709. Then considering the impediment that would be likely to arise from the prevalence of the rains during the south-west monsoon, what time do you think now might be fairly calculated for the communication between Bombay and Calcutta by land at that period?—Sixteen days perhaps; it ranges between eight and sixteen, between the possibility of the greatest expedition and the chance of the greatest impediments.

710. Mr. *Bagshaw.*] Can you state the time it takes to convey letters by Dauk from Bombay to Columbo?—No. The force of the south-west monsoon in its whole range does not extend over more than six months. The force of the south-west monsoon, on the Bombay side,. is generally considered as limited to four months.

711. *Chairman.*] Well now, we have got the expenses; we have got the 25,000 *l.* a year for each steamer per annum, and five steamers, that is 125,000 *l.* to Bombay; now we will talk about the returns, and we will talk of Bombay only; have you any memorandum of that?—I have no memorandum at all, except this little table of distances and these maps.

712. What are we to set off; what are likely to be the receipts by Bombay; what by Calcutta; and what have we to set off in the different routes against the expenses?—A very little I should think; I think from passengers we should get nothing. I do not think it would be a matter of profit to the East India Company in any way whatever, the conveyance of passengers.

713. Might they not make it so, if they chose?—They did not think they could in the Atalanta and the Berenice; they gave the passages to the captains, the only object was experimental.

714. Mr. *Mullins.*] What sum do you think it would be advisable to charge a passenger by that route, the entire distance?—Why, the amount ought to be very considerable, if you look to profit.

715. What do you think it would be fair to charge; you are aware the usual charge by the Cape of Good Hope is 120*l.*, what do you think it would be proper to charge by the other?—One hundred and fifty pounds, from Calcutta.

716. *Chairman.*] What do you expect will be the returns from passengers between Suez and Bombay?—There are two ways of getting a return; in the first place, if you turn yourselves into hotel-keepers, and find the passengers with everything, and charge so much money; in that case, charge what you will, my opinion is, the East India Company would get no profit at all. The other way is to allow the passage to the captains, and let them have a proportion, one-third, or whatever you may fix upon for their carrying the passengers at their own cost; and in that way I think you might get some money, but not much, but a great deal of complaint of the mode in which they were treated.

717. Mr. *Bagshaw.*] But experience does not bear out that fact, inasmuch as captains of ships take passengers upon the latter terms that you have mentioned, and give very great satisfaction, by way of the Cape of Good Hope?—But it appears to be the reverse by way of the Red Sea.

718. How so?—On the last voyage of the Hugh Lindsay there were great complaints by the passengers against the captain in consequence of the miserable accommodation of fare.

719. That was not a vessel calculated for the purpose?—No; but the fare; they did not complain of the vessel, but they complained of their treatment.

720. *Chairman.*] But why cannot the same system be adopted in the steamers? —Now, I will suppose that overruled, and the charge to be 150 *l.* for a passage; they would object very much to give 150 *l.* to go to Suez, when they can get to England for 120 *l.*

721. Why charge them 150*l.* by the shorter route, and 120*l.* by the other?—Because the expence of sending a steam vessel from Calcutta to Suez is very far greater than that of sending a sailing vessel from Calcutta to England.

722. Looking to the charge to a passenger with reference to the provisions to be found him on his way, what do you think would be a fair charge?—The Hugh Lindsay originally charged 120*l.* for the best cabins; they afterwards reduced it to 100*l.*, and it is now 80 *l.*

723. But that was only a certain distance?—That is 3,000 miles, Calcutta being 5,000. I should think 150*l.*, of which only 100*l.* goes to the captain, on the

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the supposition we just made of two-thirds and one-third; I should think 150*l.* would not be too much to charge.

724. One hundred and fifty pounds for the entire passage from there to England?—No, from Calcutta to Suez. Suppose you take 120*l.*; 150*l.* was what I thought myself.

725. As a proper remuneration for the passage, then, you will have 50*l.*?—Yes, 50*l.* profit from each passenger; you will have on an average 20 passengers; you will have no more.

726. Mr. *Mullins.*] That is to say, your opinion is, it would cost 100*l.* for providing a passenger comfortably during that passage?—Yes; that is to say, to induce the captain to take the risk and expense on himself in such a way as to satisfy the passengers and prevent such a round-robin as was signed the other day, to provide passengers of a steam vessel with the same degree of comfort and munificence as that with which the Atalanta passengers are provided; but for the calculation, it would be better to take the higher rate, because if you have 50*l.* profit, and that is scarcely worth reckoning upon, of course, *à fortiori*, if you only have 30*l.* profit, it is still less worth reckoning upon. These captains would not have taken the passengers on any other terms than those of having the whole of the passage-money and giving the Company nothing; they would rather have taken the vessel out without passengers at all. If you have 20 passengers a month each way, and you have 50*l.* from each passenger, that will be 1,000*l.*; then you would get about 24,000*l.* by passengers.

727. *Chairman.*] Are you talking of Bombay?—No, I am talking of Calcutta now. You are talking of one way; you are not going to have both Bombay and Calcutta. I doubt if you will have so many passengers as that from Bombay; you would not have 240 ladies and gentlemen from Bombay every year, and back to Bombay every year; that is out of the question.

728. I am speaking of passengers to every one of the presidencies?—It will depend on where they go from; passengers from Calcutta would not go to Bombay.

729. What passage-money would you propose from Bombay to Suez, and from Calcutta?—I would propose 100*l.* from Bombay, and 150*l.* from Calcutta.

730. Mr. *Young.*] You have given us your opinion as to the time that would be occupied between Calcutta and Socotra, and Bombay and Socotra; will you inform the Committee now what time you calculate it would take to proceed from Socotra to Suez in the Atalanta or the Berenice?—In the south-west or north-east monsoon?

731. In the south-west monsoon first?—You see, going from Socotra to Suez, you have got out of the line which I think you ought to be in. You have got away from Guardafui; you have got too far to the north; nevertheless you might make a course, and get back upon the coast of Africa; and in that way I should allow 800 miles for the run, at 150 miles a day in the south-west monsoon, from Socotra to Babelmandeb.

732. That would be about six days?—About six days, not quite.

733. And from thence to Suez?—From thence you have 1,200 miles to Suez against the north-west wind for the whole distance, a strong north-west wind.

734. At what rate do you calculate you might steam under those circumstances?—I think you should allow 10 days for that; it is 1,200 miles; you might do it in less, but you could not calculate on doing it in less; it is 1,230 nautic miles from Babelmandeb to Suez; 165 to Camaran, and 1,065 to Suez; that is 10 days. I think it might be done in 10 days.

735. And on the return coming down the Red Sea?—The north wind blows so much in the Red Sea, that you might almost sail down. I should think you would run down on an average at the rate of 240 miles a day.

736. Right down to Babelmandeb?—Yes.

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low so strong; then I should
soon, one day with another,

x days without delays, with-
out

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out detentions; but part of the present plan is to send sailing vessels when steam vessels are unavailable.

739. Perhaps you can give us an estimate of the number of passengers from Bombay and from the eastern side of India?—It is very difficult, because when the Hugh Lindsay has gone at long intervals, she has carried more passengers than if she had gone probably once a month; she never carried more than 20, and she has left passengers behind who wanted to go with her.

740. Mr. *Young.*] But do not you consider that the number of passengers who would be likely to pass between those respective points, would be greatly increased with any increase of facility for their passage?—Yes, I think it would; I think people would go if they had no reason for going, when they had a good opportunity of travelling provided. I think the conveyance makes passengers.

741. *Chairman.*] Then you can form no estimate of the number of passengers that would go from the eastern side of India?—No; I should think there could not possibly be 240 people by Bombay in the course of the year.

742. Mr. *Bagshaw.*] Do you happen to know the number of passengers that have been going to and fro in the course of any given year of all the presidencies of India?—No, that I do not.

743. Do you happen to know it has been stated that while Bombay only takes to and fro 603 passengers, Calcutta, Madras and Ceylon take 2,566?—I should think that is very probable; Calcutta then would supply her steam-vessels with passengers.

744. Do you think it would be unfair to suppose 1,000 passengers would go from India to and fro in the course of a year, if proper steam communication were established to all the presidencies of India?—There are a great many people who do not like steam vessels; but I think you may assume that. For all India, I think there might be 1,000; I do not know whether there would be so many by steam; I think there would be more than 500.

745. I dare say you are aware that however objections may be raised to steam vessels in this country, that in India there is quite a contrary feeling with regard to them?—Yes; and I have no doubt that that contrary feeling would become universal if they were established. There is nobody that could afford to go by a steamer that would not prefer it to a sailing vessel, if proper accommodation were provided. On that account I should say 1,000 might be assumed.

746. Each way?—Each way; not at the beginning, but after a time.

747. Mr. *Young.*] Supposing the number were equal to that which you state, namely 1,000, what proportion of them do you imagine would proceed to and from Bombay, and what proportion to and from the other presidencies of Madras and Calcutta, supposing there was equal facility for passing between the whole?—I should think not above one-sixth would go by Bombay; it would be much safer to assume 500, because that is as much as you would be able to take if you wish to establish them once a month.

748. *Chairman.*] You mean there would not be room for more?—No; not of ladies and gentlemen exclusive of their servants.

749. Well now, have you any knowledge of the Post-office receipts?—No; in fact, nobody can have any knowledge.

750. Because letters that go round the Cape hitherto cost nothing?—Or next to nothing; but that is no criterion to go by; there will be a heavy charge by steam.

751. Have you any opinion as to what should be the rate of postage?—I believe they have fixed half-a-crown for a single letter, and I think that is very fair from England to Bombay.

752. And do you know what it is to Calcutta?—No; but I believe about as much more; about as much more I think; I remember having letters that came to half-a-guinea; double letters from Calcutta; and I think it was one-half for the Mediterranean packet, and one-half for the dauk and the Hugh Lindsay. This would make about the new Mediterranean rate for the Indian dauk.

753. Is this a new arrangement of the Post-office?—Yes.

754. Mr. *Bagshaw.*] Now is it proposed in the present establishment that Mr. Waghorn shall be able to charge for the transmission of letters?—No, to charge nothing.

755. Then they will charge this way for a single letter 3*s.* 6*d.*?—No; half-a-crown from London to Bombay; that is the arrangement with the Post-office, but though they charge 3*s.* 6*d.* for a Mediterranean letter, they only charge half-a-crown for an Indian letter; and the Post-office are to receive the whole of the

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the postage, the Company are to receive none; and after the return from the postage is so deducted, the whole net remaining charge is to be divided between the King's Government and the Company. The Company under that arrangement will get nothing but the inland postage from Bombay, and therefore though that may be an indemnity to the Company for bearing one-half of the charge of sending letters to Bombay, yet if letters were sent by steam to Madras and Calcutta it would be necessary to make a new bargain, or they will get nothing at all.

756. Mr. *Young*.] Then if the arrangement at present made were altered, and a plan substituted for communicating from Suez with Madras and Calcutta direct, the Company would lose all the indemnity that they at present calculate upon to be received by them for the conveyance of letters from Bombay to the other presidencies?—Exactly.

757. That may, in your opinion, perhaps, constitute a good reason why the Company should not be favourable to such an alteration of the plan?—They would not be favourable to it without making a new bargain with the King's Government, because doubling the distance must double the charge, and deprive them of all possibility of any return.

758. *Chairman*.] Do not you think also, that the high rate of postage from Bombay to Calcutta would interfere very much with the sending of the number of letters that would go by that conveyance?—Yes. I rather think the Calcutta postage is higher than the present Mediterranean; I think somewhat more would now go to the dauk than to the Mediterranean packet, or very nearly equal.

759. Might not letters be conveyed direct to Calcutta by steam at a cheaper rate than they would be conveyed to Bombay, from thence by dauk to Calcutta?—No, I think not. I think the expense by steam would be greater, certainly. I understand the question to be, whether the steaming expense would not be as little as the dauk expense, sending them first to Bombay and then to Point de Galle, and from Point de Galle, which I understand is the plan, to Bombay, Madras and Calcutta. I conceive the expense by steam would be very much greater than that of the dauk.

760. You mean the expense of two additional steam vessels?—Yes.

761. And that therefore the postage should be increased in consequence?—You would want more than two additional steamers, because otherwise you would not take them to Bombay at all. You would want more than two.

762. Supposing that there was any room for freight in the Red Sea, do you think there would be any that you might have a profit from, freight from cargo, that is?—I should think very little; there could not be much room for freight, there would be room for treasure. The treasure is usually considered the perquisite of the captains; it was given to the captains of the King's vessels and to the captains of the Atalanta and the Berenice. Things of great value in a small compass would pay freight, but it would not do to calculate on much profit from it. No doubt there might be some, but I do not calculate on a profit to the Company from anything they will undertake in that line; there might be some returns, but not great.

763. Supposing it were a company, I do not mean the East India Company, but a private steam-company, how would it be then?—I think they would be losers by it at the very best they could make of it.

764. But you think they will gain a great deal more than the East India Company, because what can they desire more if they fill their vessels with passengers and cargo?—But there is so very little space for cargo. The Scotch steamers that run two days between the Scotch port and London carry a great deal of cargo, and they find it a very profitable return; but these vessels which run a long distance, and which have to be taken up almost entirely with fuel, can carry nothing but fuel and treasure, small articles.

765. Mr. *Young*.] Have you ever calculated what space the Atalanta or the Berenice might have disposable to cargo, after taking in the coal they would require for the longest part of the passage?—I think that might be very easily calculated in this way: if you allow them 20 tons a day, which is more than they will consume, especially the Atalanta, for she does not consume more than 15; but if you take 20 tons a day and 200 miles a day, and divide the coals upon that basis, then, according to the run, you may or not have a space disposable to cargo. If she were running 10 days, and you take for that at 20 tons a day, 200 tons, you would have 50 left in the Atalanta.

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766. Mr. *Bagshaw.*] There will be space for cargo, but not in the south-west monsoon?—Yes; a cargo from India in the south-west monsoon should be entirely left out of the question; they should carry as much coal as they possibly can; they should hardly carry gold, certainly not silver.

767. *Chairman.*] Have you at all considered the political consequences of bringing England and India so much closer together?—Yes, I have; I do not see that there could be any possible harm from bringing them closer together. I do not know any great good. I do not see what it can consist in, if we get a regular communication and know what is going on, so long as we are at peace. I do not see whether knowing in February what we should otherwise know in April, would do much good to this country or the Indian government. In time of war expeditious communication is advisable; but in time of peace regularity is the thing, and perfect knowledge when we get it; if we have irregular communication and imperfect knowledge, occasional expedition will not make up for it.

768. Mr. *Young.*] Is not a rapidity of communication very important in a commercial point of view?—I have heard commercial men doubt that; they do not want the bills and invoices without the goods; they do not want the bills to anticipate the goods.

769. Mr. *Bagshaw.*] Do not you think the commercial community think as you think politically on the subject, that regularity of information is what is so much required by them?—I have no doubt that is their opinion.

770. Mr. *Young.*] More than dispatch?—More than dispatch.

771. Mr. *Bagshaw.*] Will not a regularity in overland dispatch be of great advantage to the commercial community?—No doubt of it. The Court of Directors said something about that; respecting the general effect of carrying on these insulated experiments, that they did more harm than good: did mischief; created disappointment: threw discredit on the plan which it was their professed object to uphold.

772. Mr. *Young.*] But do you not think that the intercourse, both personal and commercial, is likely to be extended into the two countries in proportion as you diminish the difficulties of communication?—Certainly.

773. And must it not be a general benefit to India that the intercourse between the mother country and those distant possessions should be facilitated?—I am not sure that it would be any benefit to the people of India to send Europeans amongst them.

774. That would apply to an extension of European intercourse in India?—Yes, the general question was, whether the access of Europeans to India would not be an advantage to India; I do not think it would.

775. *Chairman.*] But do not you think that a consequence of this regular and speedy and convenient communication will be the resort of a great number of Europeans to India?—Yes, I do certainly; and I think the motive of passing through countries that are interesting from their antiquities, would be a motive for people to go in that line.

776. But you think a greater number of Europeans will go to India in consequence?—Yes, I think so.

777. Do you think that will have a good or a bad effect?—In what way? on the morals and domestic happiness of the people of India, I should say a bad one.

778. May I ask why?—Why, I think whenever they have come into contact with Europeans not under the control of the East India Company, they have been oppressed and ill-treated.

779. You have reference, I suppose, to indigo planters?—Not without exception; but that is my general impression.

780. And settlers?—Yes.

781. Mr. *Young.*] Must not that have arisen from the want of paternal superintendence on the part of the government of India over the interests of the population of the country?—No, it has arisen from the government not having sufficient civil power, judicial power, to control the European settlers.

782. Would not the obvious remedy for such an evil be a little extension of the civil power to that government?—Certainly; but that is objected to as soon as it is done.

783. Then your notion is founded on the supposition that the Parliament of Great Britain would not give to the government of India such power as was requisite to protect the population of India from the oppression of the Europeans?

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—The Parliament of England has given the government of India unlimited power in the way of making laws, which remain laws till rescinded by the Home authorities. The government of India have made a law, having for its express object the protection of the natives of India against European settlers. That law is subject to very great objection among the European community of the presidencies.

784. But if the government of India persists in considering that it is a paramount duty to protect the population of India from the oppressions of the Europeans, do you not think it possesses the power of doing so?—Yes I do; but I am more afraid of deference to popular clamour than I am of anything under heaven.

785. Mr. *Bagshaw.*] There is one question about the civil power that you say the East India Company wield at present against the European settlers there; is not that civil law administered in a language totally unknown to the European population generally?—It need not be; I think it has been, but I take for granted that a part of the new law will be to administer it in an intelligible language.

786. What is that law, Mahomedan or Hindoo?—The law of the Company is what is called the law of equity and good conscience; but they administer the law to Mahomedans according to the Mahomedan law; to the Hindoos, according to the Hindoo law; and of course, to Europeans according to the English law; but it will be the Company's judges' construction of the English law; it will not be an English lawyer's construction of the law, but it will be the India Company's judges' construction, according to equity and good conscience, of the way in which the law is applicable to Europeans in India.

787. But are these judges bred up to the English law; do they understand from education the English law?—No; they know nothing of the law.

788. *Chairman.*] I presume there would be a code?—It is intended to make a code, and one principle of the legislative council was to make a civil code; but they have not advanced one step in their labours.

789. Mr. *Bagshaw.*] Are not some of the judges in the interior of India both Mahomedans and Hindoos?—Yes; sudder aumeens and moonsiffs.

790. Do these men generally understand the English language?—Many of them do.

791. But none of them understand the English law?—No, of course not, nor the Company's judges either.

792. Mr. *Young.*] Coming back to the question of steam communication, do you recollect the average time occupied in passing from Falmouth to Suez?—That passage is rather long; they stop sixty hours at Gibraltar; they stop some time at Malta; and they are all vessels of small power in proportion to their tonnage; not such vessels as I would recommend for the Indian seas; and they take about 14 days to Malta, and about five or six to Alexandria.

793. And from Alexandria to Suez?—That is about three days.

794. Making 23 days?—Yes.

795. Mr. *Bagshaw.*] I am told that there is not one of the 96 sudder aumeens in the presidency of Bengal, who understand English?—I should think that cannot be correct.

796. But you know very well that the major part of them do not understand English?—I dare say they do not; but the natives of India understand more English than they are given credit for.

797. Mr. *Young.*] Then we have it as the result of the evidence you have to-day given, that during the south-west monsoon 16 days might be calculated as the time of passing from Calcutta to Bombay by dauk?—The extreme time.

798. Ten days from Bombay to Socotra, making 26 days; 16 from Socotra to Suez making 42; and 23 from Suez to England, making together 65 days; does that agree with your ordinary calculation?—Yes; but you must bear in mind, if you do not arrive at Alexandria exactly when the packet is starting, you may lose a month there.

799. Have you ever directed your attention to steam communication to India by the Cape of Good Hope?—I certainly have; and I think that for Calcutta by far the best line. If I were laying down a new scheme for steam communication with India, I would take Beirout, the Great Desert and the Persian Gulf for letters for Bombay, and the direct line by St. Helena round the Cape for letters and passengers for Calcutta.

800. *Chairman.*]

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800. *Chairman.*] And you estimate the length of that passage at what?—Eleven thousand five hundred miles.

801. Mr. *Young.*] And the time to be occupied?—Sixty days, changing the vessels at every station.

802. *Chairman.*] How many vessels?—Twelve.

803. To India and back to Europe?—Yes; that is, they would change their stations, and every one of them return progressively; they would continually change their stations.

804. And there would be no returns?—There would be some returns for letters and passengers, whatever that may be.

805. Has there been much communication with the Pacha of Egypt respecting the passage through his territories?—No; he has always expressed himself very friendly to it. He has been very desirous to have steam communication established with Egypt.

806. You think he would do everything in his power to facilitate that intercourse?—I have no doubt he would do everything in his power.

807. Do you imagine he would permit troops to pass in case of necessity?—Yes; I believe he would do anything within his power. I think he would allow English troops to pass; he would have sufficient reliance on English good faith to do it.

808. I suppose for the sake of pleasing the British Government?—Yes, and to bring people, or goods, or anything to his own country.

809. And, in short, to increase the commerce of his own country?—Yes, and the number of persons that resort to his own country. He has the materials for a railroad, which are not laid down, from Cairo to Suez.

810. With respect to the improvement of the natives of India, do you think that many natives of India would come to England?—No; I think very few.

811. Why do you think they would not come?—I think nothing would bring them here but a very strong grievance; they have great objections to the sea, all of them. A grievance would bring them, but even that would bring but few of them; I think nothing else. Here and there a wealthy zemindar might send a son or two to England; but I think the number would be very small.

812. I do not know whether you recollect an opinion expressed by a medical committee in Calcutta, that if inducements were held out, many natives would be inclined to come to England for the study of medicine, surgery and other sciences?—I do not recollect the opinion. I dare say, like all other people, if they thought they could get anything by it, they would come here or anywhere else; it would depend on the chance of profit they might see.

813. If they saw clearly it was to their interest to come to England, they would do so, notwithstanding any prejudice?—Yes, I think interest will overcome prejudice anywhere.

814. Now I do not know whether this has ever struck you as a source of saving to the Company, and therefore of profit to a certain degree; you know that all civil servants going to the Cape of Good Hope receive a considerable portion of their allowance there; that is, they receive, I believe, in the most unfavourable cases three-fourths of their allowance there?—Yes.

815. That is, men having 4,000 *l.* receive 3,000 *l.* while there?—Yes.

816. You know the military officers receive all their allowances there without any deduction?—Yes.

817. You also know it is a two months' voyage to the Cape of Good Hope by sea?—Yes.

818. You also know that the period of furlough may be, and latterly has been, extended to two years?—Yes.

819. You probably do not know; but the amount of money so expended must be a very considerable sum in the course of a year?—It is.

820. Now, do not you know that by allowing the civil and military officers to come to England instead by steam, that they would very willingly prefer that route, and if they do that a very considerable saving would be made?—Yes; but that would require a very great change in the regulations.

821. I am supposing that?—Of course they would rather come to England than go to the Cape, but they must be allowed to receive their Indian allowance in England, which under the present law they cannot do.

822. But

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822. But why should you allow them their Indian allowances, or a portion of their Indian allowances?—I mean a portion of them.

823. Because it would be the same thing as coming on a furlough; that would, you know, allow them to come to England to see their friends, which certainly would be a very considerable advantage, and I should suppose there could be no reason for continuing them their Indian allowances when neither military or civil officer in this country have them?—But many a man would rather go to the Cape and receive his allowance than come to England and lose it.

824. But would you allow him to do that; would it be reasonable to give him that advantage?—I think perfectly reasonable, as far as I see at present; no objection to it strikes me now.

825. It would be a very great expense?—To him.

826. But I mean expense to the Company?—Not, if he do not receive his Indian allowance. I am afraid I am misunderstood; I say if he comes to England and does not receive his Indian allowance, I see no objection to it; but I see great objection to his coming to England, and receiving his Indian allowance; but if you save his Indian allowance, how is it an expense to the Company?

827. I say that would be to the Company a considerable saving?—Yes; I see no objection to that.

828. The object of the Company has been always, as much as possible, to prevent the officers from coming to Europe, has it not?—I do not know that.

829. Do not you think it would be a very great advantage to officers, both civil and military, to allow them the facility of coming to England, instead of the Cape of Good Hope?—Yes; if they choose to come without their Indian allowances, in preference to staying at the Cape with them; I doubt if many of them would do it.

830. Mr. *Young.*] The question put by his Lordship was, whether you think it would be reasonable to leave to them the option of going to the Cape of Good Hope, with their Indian allowances, if they had the means of returning to England, where they would not receive them?—I do not see any present objection to that; but there may be some reason among the old restrictive regulations of the Company; if they go out of India for the benefit of their health for a certain time, I do not see what consequence it can be where they go.

831. *Chairman.*] I suppose you have heard of the great disadvantage of acting situations in India?—Yes.

832. Officers are able to go the Cape of Good Hope, or absent themselves, we will say, for nearly three years, and they receive three-fourths of their allowance during that time; somebody is put in to act in succession, and there is an acting succession of strangers, knowing they are only there temporarily, not knowing for how long and not caring about the duties of their situation?—Yes, that is all true.

833. I consider that one of the greatest curses of the Indian administration?—So it is.

834. Would you not be able to get rid of all that, by permitting them to come to England, not holding their situation?—Yes, you would; but you would save nothing then, because you would pay the full allowance to somebody else; but you would pay the person who did the duty.

835. Mr. *Young.*] Could you not do that now by an alteration of the system without steam navigation?—They would be longer in coming and going back. I understand his Lordship's argument to be, that by steam navigation the Company's officers would come as expeditiously to England as without steam navigation they might go to the Cape.

836. Mr. *Bayshaw.*] Just explain to the Committee the present plan of steam communication from Suez to Bombay?—The plan is, that all the vessels which are at present available, namely, the Atalanta, the Berenice and the Hugh Lindsay, shall be employed in this manner: the Atalanta and the Berenice alternately to go every month from Bombay to Mocha and back. The Hugh Lindsay, to go every month from Mocha to Suez and back. The Atalanta and the Berenice will take some time after their arrival at Bombay to be fitted for the Red Sea. The Hugh Lindsay will take some time to be stationed there, and when she is there, she cannot run at the utmost more than one-half the distance which this plan assigns to her. The Atalanta and Berenice are not fit for the harbour of Mocha, because they draw more water than the inner anchorage of Mocha allows; therefore, though the orders are gone out to establish

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steam navigation as expeditiously as possible in this manner, it must be a considerable time before those orders can be executed at all, and still more to the extent of establishing a monthly communication. If, therefore, letters are sent to the English post-office for India in the expectation that a monthly communication will be immediately established, all the persons relying upon that conveyance will be disappointed.

837. Perhaps you can tell the Committee when, in your opinion, the communication to Bombay will be complete?—It depends upon when we build more steamers; if we set about it immediately, and build English steamers, it will take twelve months before they can get to Bombay; that is the utmost expedition; if we send out engines to Bombay it will take longer, because here the engines and vessels could go on together; there they scarcely could until they got them; I should think that a two-monthly communication might be established now, but a monthly communication, not for two years at any rate, from this time, certainly.

838. *Chairman.*] Are there any orders for other steamers?—No; there is a promise by the Government to set about building another immediately.

839. Mr. *Bagshaw.*] When did the orders go out to Bombay?—They are just gone within this week, I think about a week ago; I do not know what conveyance they have gone by; they have gone by Marseilles most likely.

840. And that was consequent upon the report of the Steam Navigation Committee of July 1834?—Yes.

841. On an arrangement made by the Court of Directors and His Majesty's Government consequent upon that recommendation?—The Committee are of course aware that steam-packets are established from Alexandria to Marseilles every ten days; here is a Table of the distances by the Persian Gulf, by the Red Sea, and by the Cape of Good Hope to Bombay and Calcutta, and by all the routes available for steam navigation to India.

842. You would wish to put those in, would you?—If you please.

[*The same were handed in and read.*]

843. *Chairman.*] The French packets will give great facility to this communication, will they not?—Very great; they go every ten days.

844. The distance is about 1,000 miles going by Marseilles?—It is about 1,000 miles less than by Gibraltar from London, and of course the time will be materially less.

Distance from *London* to *Bombay*, in nautic miles, by the undermentioned routes:

	Miles.
By the Persian Gulf, *via* Marseilles and Malta, and from Beirout to Mohammara, in direct distance	4,518
Ditto, *via* Marseilles, Malta, Beirout and Damascus, and from Damascus to Mohammara over the Great Desert	4,698
Ditto, *via* Marseilles and Malta, Beirout, Damascus and Bagdad, and from Bagdad to Mohammara by the river Tigris	4,788
Ditto, *via* Marseilles and Malta, Souadia and Aleppo, and from Beles to Mohammara by the river Euphrates	4,823
Ditto, *via* Falmouth and Malta, and from Beirout to Mohammara, in direct distance	5,590
Ditto, *via* Falmouth and Malta, Beirout and Damascus, from Damascus to Mohammara over the Great Desert	5,770
Ditto, *via* Falmouth and Malta, Beirout, Damascus and Bagdad, from Bagdad to Mohammara by the river Tigris	5,860
Ditto, *via* Falmouth and Malta, Souadia and Aleppo, and from Beles to Mohammara by the river Euphrates	5,895
By the Red Sea, *via* Marseilles and Malta	5,238
Ditto, *via* Falmouth and Malta	6,310
By the Cape of Good Hope, *via* Johanna	10,580
Ditto, *via* Mauritius	10,790

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Persian Gulf Routes from *London*, in nautic miles :

(1.)

By Marseilles.	Miles.		*By Falmouth.*	Miles.	
Brighton	44		Falmouth	230	
Dieppe	70		Gibraltar	1,120	
Paris	114		Malta	1,020	
Marseilles	440				2,370
Malta	630		(Difference, 1,072.)		
		1,298			
Beirout	1,080				
Mohammara, in direct distance	640				
Bombay	1,500				
		3,220			3,220
		4,518			5,590

(2.)

By Marseilles.	Miles.		*By Falmouth.*	Miles.
Malta, as in No. 1		1,298		2,370
Beirout	1,080			
Damascus	60			
		1,140		1,140
		2,438		3,510
Mohammara, by Great Desert		760		760
		3,198		4,270
Bombay		1,500		1,500
		4,698		5,770

(3.)

By Marseilles.	Miles.		*By Falmouth.*	Miles.
Damascus, as in No. 2		2,438		3,510
Bagdad	500			
Mohammara, by Tigris	350			
		850		850
		3,288		4,360
Bombay		1,500		1,500
		4,788		5,860

(4.)

By Marseilles.	Miles.		*By Falmouth.*	Miles.
Malta, as in No. 1		1,298		2,370
Souadia	1,100			
Aleppo	70			
Beles	55			
Mohammara, by Euphrates	800			
		2,025		2,025
		3,323		4,395
Bombay		1,500		1,500
		4,823		5,895

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Red Sea Routes from *London*, in nautic miles.

(5.)

By Marseilles.	Miles.		*By Falmouth.*	Miles.	
Brighton	44		Falmouth	230	
Dieppe	70		Gibraltar	1,120	
Paris	114		Malta	1,020	
Marseilles	440				2,370
Malta	630				
		1,298			
Alexandria		830			830
		2,128			3,200
Cairo	100				
Suez	70				
Camaran	1,065				
Babelmandeb	165				1,400
		1,400			
		3,528			4,600
Bombay		1,710			1,710
		5,238			6,3

(6.)

By Marseilles.	Miles.	*By Falmouth.*	Miles.
Babelmandeb, as in No. 5	3,528		4,600
Point de Galle	2,360		2,360
Calcutta	1,170		1,170
	7,058		8,130

(7.)

By Marseilles.	Miles.	*By Falmouth.*	Miles.
Point de Galle, as in No. 6.	5,888		6,960
Madras	540		540
Calcutta	720		720
	7,148		8,220

Cape of Good Hope Routes from *London*, in nautic miles.

(8.)

			Miles.
Falmouth			230
Teneriffe	1,400		
Cape Verd	810		
St. Helena	1,990		
Cape of Good Hope	1,500		
		5,700	
Johanna	2,160		
Bombay	2,490		
		4,650	
			10,350
			10,580

(9.)

			Miles.
Falmouth			230
Cape of Good Hope, as in No. 8.	5,700		
Mauritius	2,370		
		8,070	
Bombay		2,490	
			10,560
			10,790

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(10.)

		Miles.
Falmouth		230
Mauritius, as in No. 9	8,070	
Calcutta	3,230	
		11,300
		11,530

(11.)

	Miles.
Calcutta, as above	11,530
Deviation to Madras	90
	11,620

Mr. *A. P. Wall*, called in; and Examined.

Mr. *A. P. Wall.*

845. *Chairman.*] ARE you acquainted with the Bay of Bengal?—I am.

846. You have commanded a steamer for some years?—I have for the last seven or eight years.

847. Is there any difficulty, do you conceive, in a steamer of the power of the Atalanta or the Berenice going from Point Palmyras, in the south-west monsoon, at the mouth of the Hoogh?—None.

848. Supposing it did blow very hard, is there not a course in shore that they might take?—Yes; they might take a course round in shore by surveying it; it is not at present buoyed off.

849. You know the fact to be so?—I know that to be so. The native vessels invariably use it in its present state.

850. Then what is your opinion of the practicability of making a passage along the coast down to Madras, and on to Bengal?—I think there is every facility; in the south-west monsoon the wind veering to and from the land, it is never a very heavy sea.

851. Does it blow home then in the south-west monsoon; does it blow quite home to the coast?—No; the wind veers from the shore at night and to the shore in the day time.

852. Is there any strong swell there?—Not a very heavy sea close in to the land, it is considered a weather shore and little sea.

Major *Charles Head*, called in; and Examined.

Major *C. Head.*

853. Mr. *Bagshaw.*] YOU are prepared to make a statement to the Committee, regarding a plan of steam navigation to India by way of the Red Sea?—Yes.

854. Have you that plan with you?—I have it not with me at present; it is prepared, but I have not brought it with me.

855. Will you deliver it in to the Committee?—I will; I have not brought it with me, not supposing it would be called for to-day, but I will forward it immediately to the Committee.

Mercurii, 28° *die Junii*, 1837.

MEMBERS PRESENT.

Mr. Bagshaw.	Mr. Gordon.
Lord William Bentinck.	Sir J. Hobhouse.
Mr. Crawford.	Mr. Mullins.

LORD WILLIAM BENTINCK, IN THE CHAIR.

Alexander Galloway, Esq. called in; and Examined.

Alex. Galloway, Esq.

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856. *Chairman.*] YOU are a civil engineer, residing at West-street, Smithfield?—I am also a manufacturing engineer.

857. Are you acquainted with Egypt?—I have been there, and two of my sons are there at present.

858. How long have you been in Egypt?—I was there about six months; my eldest son had been there 12 years.

859. Are your two sons that are there civil engineers?—They are.

860. Are you going to Egypt by desire of the Pacha?—Yes; I am written for by the Pacha; he wishes to consult me upon the propriety of forming a railroad between Alexandria and a place called Adfa.

861. Will you explain what that railway is; its length, and its objects?—The railway I apprehend can be formed in about 50 miles in a right line, as near the banks of the canal as may be deemed expedient; there is a canal running from Alexandria to Adfa, which canal saves all the necessity of coming into the Mediterranean from the Rosetta branch of the Nile, and saves a distance, probably, I should say, of about 60 or 80 miles; that is, it is nearer to take the canal, by 80 miles, than it would be to go down the Rosetta branch of the Nile, and then get into the Mediterranean. This is the plan of the railway from Cairo to Suez as submitted by witness [*producing the same*]. It is so designed as to always insure the means of communication from a vessel at any period. I believe there is a current in the Red Sea. Those are what are called the camel tracks, [*pointing out the same upon the plan*]; this is the centre road; and this is what is called the upper, and this the lower, or least frequented road, not surveyed; this has been surveyed, and this is deemed to be the best line for making the railway; now the Pacha has suspended this railway merely because he does not feel that the British Government has given him any countenance in the measure. When my son, a bey of Egypt, arrived here, in November 1834, he applied to our Government, and stated what the Pacha was anxious for them to do; simply to express a disposition to pay a mileage, such as they themselves should fix; he thought 6 *d.* a ton per mile for the 80 miles would be to him a sufficient compensation for goods; and as to passengers, he made no stipulation about them. Now, at that period I believe the East India Company were very anxious to make a communication up the Euphrates; that I believe is now tolerably well proved cannot be a practicable project, and therefore I am of opinion that if this Committee could express any opinion, or give him any encouragement, he would proceed with the undertaking, for he has already about 200,000 *l.* of the material, with engines and apparatus, for this road. It goes in a right line across the Desert 80 miles.

862. Mr. *Mullins.*] Have not the rails already sent out been applied to the construction of other roads?—No. There is now in the Mokattam Hills an immense quantity of stone; and for supplying Cairo and the neighbourhood with stone there is a railway from those hills to Cairo.

863. They are a different sort of rails from those provided for the Isthmus of Suez?—They are; the rails upon the Cairo road weigh about 60 lbs. to the yard, whereas the rails for the railway from the Mokattam Hills are not above 36 lbs. to the yard.

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864. Do you know whether any inquiries have been made regarding a supply of water along the line?—There have been inquiries, but the extent and detail of those inquiries I am not cognizant of, but the plan is to carry tenders of water from the Nile, and from the Suez; we have made carriages for the conveying of water, and we have made eight engines upon the road for pumping the water up to tanks for the feeding the locomotive engines.

865. What is the distance of this proposed line?—Eighty miles in a right line, and four miles to the north of Cairo, making it 84 miles.

866. *Chairman.*] Have rails for the whole way been sent out?—About a third.

867. Is there any difficulty in making this railway?—No practical difficulty whatever.

868. Is it good ground throughout?—Capital ground.

869. Will there be any cutting in any part of it?—There will; somewhere about four millions of cubic yards to cut, and there will be nearly as much hollow space to fill up in its immediate neighbourhood, and therefore the cutting will be an advantage.

870. Is there no tunnel?—There is one point at which you might tunnel, but I should say, in a country like Egypt, that tunnelling would be a very unpleasant thing; there is no part of this country where we have anything like a distance of 80 miles that would cause so little labour as the line selected in that country.

871. Probably the Pacha has the labour pretty cheap?—About 6*d.* a day for a strong man; and it will cost for engines and for iron-work from this country about 600,000 *l.* for the double line; that is about 7,500 *l.* per mile; that does not include the labour necessary for cutting the road.

872. Is there much traffic between Suez and Cairo?—A great deal; an immense traffic might be created, with proper facilities for conveyance.

873. In what articles?—Mostly coffee; the Mocha coffee is greatly preferred in all Egypt; a great deal of drugs, and also there is corn and various kinds of produce brought from there, and the trade would be considerably more if the facilities for communication could be increased. I believe the quickest time any journey ever was performed from Cairo to Suez has been three days; now we should accomplish it in four hours by the railway. I have no hesitation in saying that if railways were laid down judiciously in Egypt, and steamers from Adfa to Cairo established, we should be enabled to perform the distance from Alexandria to Suez in 24 or 30 hours, instead of which it now generally averages from eight to ten days.

874. You mean the railroad to Adfa, and then from Cairo to Suez?—Yes.

875. Mr. *Mullins.*] What is the distance from Cairo to Adfa by the river?—It is difficult to say; the Nile is very circuitous; I think myself it is from 140 to 150 miles by water; it will depend a great deal upon the state of the river, for in the high Nile, it is a much shorter distance, but in the low Nile, they are obliged to take the line of the Nile, which is very circuitous. In one of the quickest boats I was three nights and three days in going from Adfa to Cairo. The Nile is sometimes running into the Mediterranean at the velocity of two to four-and-a-half miles an hour.

876. Was it low Nile when you went?—No, the Nile was in good navigable order. We went across the country by one of the shortest courses you could take, but you can get very well from Cairo to Adfa, probably in 36 hours, with the wind and the current. The current is running four miles an hour, and sometimes four miles and a half.

877. Has the Pacha any steam-boats on the Nile?—He had one only.

878. Do you know whether he contemplates increasing them?—Yes; the fact is, he would do everything that would give facility, if he had anything like encouragement to do so; he does not want any pecuniary aid from this country; all he wants us to say is, that we think it would be a means of contributing to the prosperity of Egypt, and the prosperity of England.

879. Has he any steamer in the Red Sea?—None at this time.

880. Do you know whether he contemplates having any there?—When I was there he did contemplate having two, for the sake of bringing his own produce.

881. Is it your opinion that he would consent to the passage of troops through Egypt if the British Government asked it?—I have no data to give an opinion

upon, but if he could understand the object was not to interfere in the independence of Egypt, I should think he would not have the least objection; I know he has the strongest predilection on behalf of England. He is a very enlightened man, and a man of vast liberality.

882. Mr. *Gordon*.] When you speak of the enlightened character of the present sovereign of Egypt, is it not the case that everything depends upon him?—I believe it does. Ibrahim, his son, is a man equally enlightened and liberal, as far as policy extends; a much better educated man than his father, but I do not think he has anything of the splendid genius of the father; the father is a most extraordinary man.

883. But all our communications through Egypt to India must in a great degree depend upon the character of the sovereign who rules the country?—No doubt about it. Ibrahim is a man that has supported every liberal measure that can be suggested; and also there is a grandson that is a very able young man, that would succeed Ibrahim.

884. *Chairman*.] Do you mean Ibrahim's son?—No, not Ibrahim's son; this grandson is a brother's son.

885. Mr. *Mullins*.] Is it your opinion that the Nile in its low state would be fit for such flat-bottomed steamers as ply on the Indian rivers?—There is no doubt about it; in the lowest Nile, any vessel drawing two feet six inches or three feet can pass, and it is a very short period that the Nile is so low. It would be fully as navigable as the Thames to Richmond at the lowest state.

886. Do you know whether the plague would cause an interruption in the regularity of the intercourse?—It is only in the last six or seven years that they have had any sanitary law at all; but now any vessels coming from any infected place perform regularly quarantine in a distinct harbour; I suppose the ancient harbour of Alexandria. The last plague was occasioned entirely by the unwise and injudicious conduct of the persons who jumped overboard and swam to the convent. It commenced there.

887. As a periodical disease, you do not think it need affect the regularity of the intercourse?—Not at all, I think. My sons have been there during the last two plagues; they were in Egypt, and they never found great inconvenience from it, with proper care. I do not think in both the plagues there were more than 30 or 40 Europeans that died, and any death that takes place during that period is all set down to the plague.

888. Is that because Europeans take greater precautions?—The fact is, that the habits of Europeans are more cleanly, and Alexandria is a very injudiciously situated town; it is low, and there is no pains taken whatever to drain it or to cleanse it in the old town. In the part they are now building there is every attention paid. Ibrahim Pacha has built a considerable number of buildings there.

889. Is the trade great between Alexandria and Europe?—I should say that perhaps seven-eighths of all the cotton is exported from Egypt to different European states; about one-eighth is used in Egypt in its own manufactories. There are generally 200 sail of European vessels in the port of Alexandria.

890. Do you know what steamers the Pacha has there?—He has got two or three.

891. Are they large?—Yes, the Nile is a very large one; it has two 200-horse engines.

892. Do you think that the Pacha would be willing to establish a reasonable rate of custom duties upon goods coming by the Red Sea?—I believe he never contemplates asking more than 6 *d.*, and I believe he would be satisfied with 3 *d.* per ton per mile; now taking it at 80 miles, at 6 *d.* it would be 40 *s.* a ton, and at 3 *d.*, 20 *s.* for the whole distance. Now, I am quite sure that he would be well requited at 3 *d.* per ton per mile.

893. Mr. *Mullins*.] You allude to the railroad particularly; may he not make other charges in the shape of port dues, and for traversing the Nile?—I do not think so. If he was to employ vessels to convey the goods along the Nile, of course he must be paid for such conveyance; but if the parties forwarding the goods had their own vessels on the Nile, I do not apprehend there would be any charge; he is a man of great liberality of mind; there is nothing grovelling or little in him. The revenue of the country is about seven millions sterling, and I do not believe he spends 10,000 *l.* a year upon his own person.

894. *Chairman*.] When he has occasion to send troops from Alexandria to Suez,

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Suez, how does he send them?—All upon foot, along one or other of the roads; there are three roads.

895. Is there any water for a body of men?—They generally carry water by the camels. There is one well, but I do not think it is in the line of either of these roads upon the Desert. I see no difficulty in getting water.

896. Then are you of opinion that in all respects, whether as regards the duties or facility of passage, we shall meet with every support from the Pacha of Egypt?—I am quite sure that you will meet with as much support in every project to promote our welfare as if it was in our own country.

897. Did you make the machinery for the vessel called the Nile?—No; I was in Egypt at the time it was done.

898. Was it made there?—No, it was made by Bolton & Watt.

899. Is not there a great foundry in Egypt?—Yes; one erected by my son, at Bolack, one of the first iron foundries in the world.

900. Are there many engineers in Egypt?—There are always a good many. There are altogether workers in iron in Egypt, perhaps to the extent of 5,000 workmen. They manufacture all their muskets now extremely well.

901. Have they educated any natives as engineers?—Yes, a good many; there are not above, perhaps, 40 or 50 English, and the rest are all natives.

902. If any of our steamers came into Suez out of repair, could they be repaired?—Yes, very easily.

903. Are there ample means of repair?—Yes; they could not perhaps do it with as much dispatch as we could do it, but still they could perform effectually.

904. Mr. *Mullins.*] Do you apprehend that workmen could be found sufficiently expert to effect any repairs that might be necessary?—Yes,. plenty.

905. *Chairman.*] Where is the foundry you have spoken of?—It is about a mile and three quarters from Cairo; it is upon the banks of the Nile.

906. Then the engineers and workmen could be easily transported to Suez for repairs, if wanted?—Yes, if they had a railroad from Cairo to Suez they would be there in four hours. There will be water-tanks every 10 miles, and a stationary engine for pumping it up into tanks provided to supply the boilers of the locomotive engines. The tenders discharge the water into a lower level, and then it is raised up to an elevation for the purpose of feeding the boilers of locomotive engines, the same as in England.

907. Is there plenty of water at Suez?—Plenty.

908. Would the water come from the Nile or from Suez?—One half would be supplied from Suez, and the other half from Cairo, which is the best mode of supply to save time and expense.

909. Mr. *Mullins.*] Are you aware that a well has been discovered half way between Cairo and Suez?—No; yet I have not the least doubt, if there were any trouble or any science employed there, it would be discovered in other places.

910. Have either of your sons given an opinion upon that point?—No, they have not, to my knowledge.

911. *Chairman.*] Do you know whether there has been any boring?—Yes, and they have found water.

912. At what depth?—I think about 200 or 300 feet.

913. Was the water good or brackish?—Very good water, I believe.

914. Mr. *Mullins.*] Under whose direction were those borings made?—They were made by persons from England, but I believe it was in the line to what they call the Kordifan Mountains, where there is an immense quantity of iron and coal; but they soon found that the conveyance of iron and coal from Kordifan would be more costly than from England. But they have discovered very superior coal and very superior iron in Syria, within about 18 miles of the sea, and they have last year sent 1,200 tons of that coal to Alexandria from Syria. We have sent out some very experienced coal and iron miners there.

915. Can you form any opinion as to whether the coal so discovered would be available for steam purposes?—No doubt about it; there is very little coal that will not answer, though, when you come to generate steam, one coal will be more economical than another. I have not seen the coal myself; I have received information that it is most excellent coal, and it is among some of the first levels; now, we know that coal always gets better as you get deeper.

916. Do you know whether any specimen of that coal has been sent to this country?—I do not think there has, because, if there had, I should have been sure to have seen it.

917. *Chairman.*]

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917. *Chairman.*] What distance are the coal pits?—I believe the distance from Alexandria to the port in Syria is somewhere about 350 miles. It is what they generally perform in from three to five days in sailing vessels. I have no doubt that the Pacha will be quite competent in a very short period to supply all the steamers at Suez. Hitherto it has cost 5*l.* a ton for the steamers at Suez; now, we could send coals from England, and deliver them at Suez at 2*l.* 15*s.* a ton, paying the freight from England. The best evidence that Syria coal would answer for the purpose of generating steam is, that the Nile steamer has been supplied with that coal, and I believe they have made coke from it for the foundry; but the part where the coal pits are situated is 18 miles distant from the sea, on the coast of Syria, and they have no roads, and no means of conveying it but upon the backs of animals, and it is a question of economy. If we can send coals from here to Alexandria, and deliver them at 40*s.* a ton, the Pacha says, "What do they cost me in coming from Syria?" and if they cost a shilling more from Syria, he will have them from England. We have sent, in the last two years, upwards of 10,000 tons of coals for him to Alexandria.

Captain *Andrew Henderson*, called in; and Examined.

Captain *Andrew Henderson.*

918. *Chairman.*] ARE you acquainted with the Indian seas?—I am, for 20 years.

919. Have you commanded both steam vessels and sailing vessels?—I have.

920. Is there any difficulty in going in a steam vessel from the mouth of the Hoogly to Point Palmyras?—None whatever.

921. Do you state that upon any experience of your own?—Yes; I have often gone there, both in steam vessels and in sailing vessels, and there is no difficulty in either the one or the other.

922. In making the passage from Point Palmyras to Madras, and then from thence to Point de Galle, during the south-west monsoon, would there be any difficulty for a steamer?—There would be none, except from a foul wind; certainly none which a steamer could not contend against.

923. Along the whole of that coast are there not land and sea breezes?—It varies, but generally speaking, the wind is off the land in the south-west monsoon.

924. At what rate do you think one of the large Scotch steamers would make that passage against the monsoon?—I should think they ought to average five or six knots against the monsoon.

925. Are you acquainted with the sea round Dondera Head?—I have been there two or three times.

926. Do you think a steamer could make a direct passage from Point de Galle through the Golandos Channel to Socotra?—I think it is practicable, but she would, of course, meet with difficulties during the south-west monsoon.

927. Do the difficulties arise from the wind or the current?—Both.

928. Did you ever make that passage during the south-west monsoon?—Never; it is never attempted by sailing ships, because they are mostly deeply laden ships, but I think it would be practicable for a steamer or for a fast-sailing trader.

929. Have you never been there at that season?—Yes, I have come round this way; I have never gone round against a monsoon there, because it is seldom attempted by sailing vessels, but that has lately been done by several of the clippers.

930. Will you explain what a clipper is?—A ship built for fast sailing.

931. And the passage has been made round Dondera Head to Bombay several times?—Yes.

932. You made a voyage from Calcutta to Canton in the Forbes steamer, towing another vessel?—Yes.

933. What was the power and tonnage of the Forbes?—One hundred and seventy horse power, 302 tons.

934. What was the tonnage of the vessel tugged?—Three hundred and eighty five.

935. At what season of the monsoon was it?—It was against the north-east monsoon.

936. You performed the voyage to China?—I did.

937. Was the monsoon strong?—It was a strong monsoon.

938. Was it more or less strong than the south-west monsoon in the Bay of Bengal?—It was less strong in the first part of it; in the last part we got out of fuel, and were obliged to make sail, and we got a strong gale.

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939. *How many knots an hour did you make while you tugged this vessel against the monsoon?*—*According to the state of the wind, from three to six.*

940. *There is nothing in the monsoons in the Indian seas that would prevent the passage of a powerful steamer at all times?*—Certainly not, barring the chance of their falling in with a hurricane, which they must take in all seas.

941. *And in the event of falling in with a hurricane they would ride it out as well as any other vessel?*—*Just so.*

942. Have you been at Socotra?—I have never been in that part.

943. The wind is said to blow hard, and that there is a considerable sea round the island of Socotra?—So I understand it, and that the wind blows stronger there than further down.

944. Do you think there would be any difficulty in a powerful steamer making that port?—She would have to contend with more sea than there generally is, but no practical difficulties certainly.

945. Mr. *Mullins.*] You are acquainted with the Forbes steamer; can you state what quantity of coals that vessel carried?—I think, with the very best coals, she carried 11 days.

946. In how many days was the passage effected?—We had a supply on board the ship also; we had only one good supply at starting; we were obliged to take fire-wood at Singapore; and in China no arrangements were made, and we were obliged to take whatever we could get, new wood, and all kinds of things; but if we had good coals, as we had at first, she would carry 11 days, and she did it.

947. *Chairman.*] You must have passed very often through the Straits of Malacca?—I fancy about 40 times.

948. You must have heard a good deal of the piracy going on in those seas? —Yes.

949. Do you think that could be put down by a steamer?—Very easily.

950. Is it not impossible to do it by sailing vessels?—It is possible to do it by sailing vessels, if we go determinedly to work as Captain Chance did.

951. Mr. *Mullins.*] Do you think the Forbes was a proper vessel to make the passage from Calcutta to China?—Not at all; she was built as a tug-vessel in the Hoogly; and in the case of her being sent to China, it was an opportunity that occurred at a week's notice.

952. *Chairman.*] From your experience, what tonnage and horse power should you think would be best adapted for a steamer to perform such a passage?—I should think the larger the better for a long sea voyage.

953. Can you name any vessel that you think well adapted for the purpose?—Such a vessel as the Monarch.

954. What is her tonnage and horse power?—Two 90's. There is another very fine boat to Hamburgh, a vessel of great capacity, which is the thing principally wanted, for carrying coal; the larger the better, because the more space you have for carrying fuel; and as you increase the size of the vessel she will be better able to contend with the sea, and be propelled by a less consumption of fuel in proportion to the size.

955. Mr. *Mullins.*] Is it your opinion that in a vessel of a larger class there would be less danger of straining the machinery in hard weather than in a smaller one?—I certainly think so.

956. *Chairman.*] According to your own experience, what sized vessel would you recommend for the communication between India and Suez?—I think for a long voyage a vessel not less than 1,000 tons, with a horse power in proportion.

Thomas Edward Michell Turton, Esq., called in; and Examined.

T. E. M. Turton, Esq.

957. *Chairman.*] YOU were a barrister at Calcutta?—I was.

958. You practised in the Supreme Court?—Yes.

959. How many years?—About 15 years.

960. You were a member of the steam committee at Calcutta?—I was a member of the New Bengal Steam Fund Committee.

961. You lately arrived from India by the route of the Red Sea from Egypt?—I came from Calcutta by Bombay. First I went to Bombay, and then from Bombay to Cosseir, across the Desert to Ghenah, and down the Nile to Cairo, and from thence to Alexandria.

962. Did you bring your family with you, and of what did it consist?—I did. It consisted of my wife, myself, and six children, besides our servants. I had one child of nine years, and all the rest under six; one indeed was only just a year old.

963. In

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963. In what manner did you make the voyage to Egypt from Calcutta?—From Calcutta I went in a ship, my own ship in fact, to Bombay.

964. How long were you making the voyage?—I was two months; I was obliged to go down into eight south, to round Ceylon and make our westing in that latitude, and then to come up again to the Malabar Coast. At Bombay I remained a month, or nearly so, and there I hired a small vessel to go to Suez in the north-east monsoon, and I had a very favourable voyage from there to Cosseir, a fair wind almost the whole way, as far as lat. 23 N., which it invariably is at that season. I was just one calendar month.

965. Did you find any difficulty or encounter any danger in your passage through Egypt?—None whatever; I found no more difficulty than that which must attend the removal of a large family, such as I describe, in any part of the world. We travelled with very little inconvenience, and as to danger there is literally none.

966. What are the facilities of travelling across the Desert, and might those facilities be readily and at a small expense increased?—The facilities, such as they are, are considerable. You carry most things with you. Good servants are easily to be procured, except from Cairo. The hire of camels is exceedingly reasonable; the hire of donkeys, upon which you ride, is also very reasonable. Food and provisions are readily obtained, with the exception of water, which you are obliged to carry with you a great part of the way. You travel slowly, but the road is perfectly good and level. There is not a danger of any kind upon the whole road, and the road is generally tolerably hard; in fact, it is not a deep sand, as I had expected, except here and there; and I understand that the road across the Desert from Suez is much better than that from Cosseir to Ghenah, in which there is a rise on one side, and a proportionate fall again to descend into Ghenah.

967. Might not those facilities be easily increased?—I consider a very trifling expense would convert that road into a perfectly good carriage road, as good as any in England. The materials are upon the spot, and only a slight proportion of labour is required to convert it into a perfectly good carriage road; the same I understand is the case as to the Suez road.

968. Were you in any degree inconvenienced or impeded by the plague, or the apprehension of coming into contact with persons infected by it?—Not in the slightest degree. It was not, however, the season of the plague, though there were occasional cases of plague, and we had foul bills of health from Alexandria. There were occasional cases of plague at Cairo; but both at Cosseir, at Ghenah, and the whole way down the Nile to Cairo, we intermixed freely with the natives of the country, without the slightest precaution whatever, and both myself and my children, including even the infant, rode about the bazaars at Cairo to see what there was there, and intermixed with every person we met, and never felt the slightest apprehension, nor, I believe, had any cause for it. I consider the plague, except at certain seasons, a mere bugbear; for at the very season I went, I met Lord and Lady Brudenell, who I think expressed some apprehension of coming into contact with the natives from it. They had come from England fresh with the prejudices of England as to the plague, and felt an apprehension which I did not in the slightest degree. I found that every person in Egypt treated the subject of the plague very lightly indeed.

969. Have you ever considered the subject of steam communication with India by way of the Red Sea?—I have. In consequence of being upon that committee I considered it necessary to consider the subject much more than I should otherwise have done, and what time I had to spare I have devoted a good deal to the consideration of the subject.

970. What are the wishes and desires of the Calcutta community, so far as you, as a member of the steam committee, are aware of them, upon the subject of steam communication with India?—I can say in general, as having been deputed by the committee here to represent them in common with other members of the committee formed in London, that they desire most undoubtedly a comprehensive plan, which would embrace all the presidencies. They certainly do not consider that Bombay would contribute its due proportion to the expenses, but they think that that, as well as every other part of India, ought to be included in the communication, and it ought not to be merely a question of what they would pay in one portion of India, and what they would pay in another, but that every part of India ought to have the benefit of a speedy communication with Great Britain. They are exceedingly

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ingly desirous of avoiding the expense, delay and risk (from robbery at all seasons, and from swollen rivers, during the period of the rains,) which are very considerable between Bombay and Calcutta; they consider that they would save time and expense very considerably by the route of the steam vessel being direct to Calcutta, and they consider that it is rather hard that they should be taxed alone by a heavy inland postage for the benefit of that communication, whereas Bombay would pay nothing whatever to the Indian government, receiving her letters with only the Mediterranean postage. If the steam communication were only to go to Bombay there would be no sort of convenience as a route for passengers either to Calcutta, Madras or Ceylon, if the communication was confined to that; and we certainly do consider that a steamer from Socotra would reach Galle as soon as a steamer would reach Bombay, and that the steamer would go on to Calcutta in six or eight days, according to the time of the year and the weather she might meet with, and thereby save time as well as greatly increase the convenience of communication. They also feel satisfied, that to make it answer, all the presidencies must be taken in, and that it will answer if they are all taken in, but that it will not answer, under any circumstances, if only Bombay is taken in. That is the general outline of their views upon the subject. We consider that the return which we shall give from the three presidencies of Calcutta, Madras and Ceylon would not be less than 133,600*l.* towards the expenses of the plan. Supposing the route to be complete, not only from Calcutta and Bombay to Suez, but from Alexandria home, which we consider would contribute very much to the profit of the whole scheme, as well as to the advantage, our calculation is this: one half of the present number of passengers, that is 1,280, at 95 *l.* each, net profit, would yield 121,600*l.*, and the letters being 120,000, which is also a moiety of the whole letters that go to those presidencies in India, at a rupee each, would return 12,000*l.*, and that would make 133,600*l.*, exclusive of all freight, specie, parcels and periodicals. Now, Bombay yielding a like proportion, at the same rate, will only give 302 passengers, paying 28,690 *l.*, and 26,000 letters, paying 2,600*l.*, that would make 31,290*l.* only; whereas the expense must be precisely the same, whether it goes to Calcutta or not, up to the point of Socotra. We also consider that there would be a considerable freight if it went the whole way, and particularly for specie, between Madras and Ceylon and Calcutta and Bombay, exclusive of plate and jewellery, &c.; there would be none, literally none, if it was to be confined to Bombay. I do not suppose they would carry an ounce of treasure, with the exception of articles of plate for the consumption of the Bombay market, in a twelvemonth between Bombay and Alexandria. We also consider that if steamers of adequate power and tonnage were placed upon the whole line, there can be no doubt that one half the passengers and one half the letters, at the rate at which I say, would go by that route in a very short time; I will not say that it will be the first year, but I consider that it would within a very short time be at least to that extent. I am borne out in that opinion by other gentlemen from Calcutta and from Madras and Ceylon; they all think with me upon that. They think that a communication to Bombay alone would be useless for any purpose but that of postage to India; I mean if confined to Bombay, and I beg I may not in the least degree be understood as in the slightest degree advocating any communication which excludes Bombay from participating in every advantage which is to be derived from it. I have made my calculations upon vessels similar to the Medea, which I saw in the Mediterranean, and over the whole of which I went, a vessel of 800 tons and 220-horse power. I consider that she is as perfect a vessel as it is possible to have; in economy of fuel, in her rate, in her capacity, in all those circumstances, she is the finest vessel, without any exception, that I have ever yet seen as a steamer, and I therefore thought it was better to make any calculations upon the subject according to what is known as to the Medea, than to make them upon any plans of my own.

971. What is the Medea?—It is one of Her Majesty's frigates, which I saw in the harbour of Valetta; she carries two very large guns, and two smaller guns upon the main deck.

972. Will you state the plan that you would propose for carrying this steam communication into effect?—I should propose that a sufficient number of steamers of 800 tons and 220-horse power be placed on the whole line between Calcutta and London, and Bombay and London, taking charge throughout the whole distance of passengers, parcels, specie and cargo, the mails leaving London on the 1st of every month, and Calcutta the 15th. As there is only two-thirds of the distance to Alexandria that there is between Calcutta and Suez, the mail from

London of June will thus meet the Calcutta mail of May in crossing Egypt, and no detention beyond the week allowed for the crossing of passengers between Suez and Alexandria, and *vice versâ*, (which in case of any unforeseen delay may be shortened, even perhaps to three days, as stated by Mr. Peacock,) will in any event take place. Thus the London mail of 1st June, touching and changing steamers at Gibraltar, and touching at Malta, will arrive at Alexandria about the 19th, and the passengers will be ready to embark at Suez on the 20th. The Calcutta May mail will leave Calcutta on the 15th of May, and touching at Madras to take in mails and passengers, will reach Galle on the 23d, and taking in coal, depart for Socotra the following day, where it will arrive on the 2d of June, and meet the Bombay steamer, transferring the passengers and mails, &c. immediately to another steamer, to be in readiness there, it will reach Camaran in four or five days, say the latter, which will make the 7th of June, and there take in coal; it will reach Cosseir in the same time, say, allowing a day's detention for coaling, on the 13th, and Suez in less than, or say in, two days; this will make it the 15th of June. The Committee will recollect that I have stated that the passengers from London would be in Suez on the 26th to start. The boilers and flues may be thoroughly cleansed and the engines repacked before the 26th, the day for her returning with the June mails from England. In like manner, the Indian passengers and mails will cross to Alexandria by the 22d of June, and proceed to England, only transhipping into another steamer at Gibraltar, where they will arrive by the 11th of July; 57 days from Calcutta. The Committee will allow me to state why we are very anxious that this plan should be adopted. I am satisfied myself that it is the best and the most efficient course, and would be the cheapest in the end, because I feel assured that I very much underrate the intercourse there would be, after a short time, between the different presidencies and London, in saying, that one half the passengers and one half the letters would go by that route; and I think (what seems to be the most difficult matter in any other way) that families of children would invariably go by that route and not round the Cape. It would also save the whole quarantine, which would be performed at sea instead of Malta. By transhipping at Gibraltar into a fresh steamer, keeping the Alexandria steamer in quarantine after the passengers quit her for ten days, during which time she might be efficiently fumigated, and allowing one or two days for inquiries after the passengers arrive in London, all the rest of the quarantine would be saved; and this seems to me the only method to induce families to send their children. It is impossible to interfere with the quarantine in the Mediterranean, because it involves all our relations with the whole of the continental ports, and if we were to make an alteration that would lessen the quarantine, the result would be that there would be a second quarantine to perform in the Mediterranean ports. If we keep it entirely in our own possessions at Gibraltar and London, then we can by that means make any regulations that we like. By this mode a person might come home to London, and might be out again at Rome infinitely sooner than he could by leaving Alexandria, going to Malta, performing quarantine there, and going from thence to Rome by the speediest conveyance they could get. Supposing we availed ourselves of the French steamers, it would be impossible to induce families to trust their children to vessels of that kind, with which they had no communication in Calcutta. Besides, the passage through France would not do; but taking the route I have described, I feel no doubt that if the expense were made the same that it would cost to go round the Cape, almost every person would go that way, and send their children that way. To do this properly there should be a treble line from Suez to Calcutta of two each, or six steamers, and two from Socotra to Bombay. The few days during which the engines would be worked in the month would probably enable these eight steamers to keep up a constant communication. But Mr. Peacock has said that a steamer ought not to work more than 16,000 miles upon an average during the year, and therefore it might be safe to have two spare ones, one to be left at Calcutta, and the other at Socotra or Bombay, whichever would be most convenient, and this would be amply sufficient. I believe the steamers would do it without, because the runs would be short, and the great object is to have short runs and the opportunity of frequent examinations and repacking of the engines, because if there is any improper friction it produces damage very quickly till the injury is remedied; but I believe that if you have a frequent examination the engines will go twice the length in the year that they will with the long runs. I consider that four, or five at the outside, would be necessary in the Mediterranean, keeping one constantly in quarantine at Gibraltar for ten days after her arrival, during which

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which the crews might clean the vessel. I consider also that the vessels upon the Mediterranean side would be much less expensive, both in coals and in repairs, because it is obvious that they can be done at infinitely less expense at home, and besides that, for coals they would have no tonnage to pay, except at Gibraltar and at Alexandria, therefore I do not allow the same rate for that; but I am satisfied that I allow a sufficient rate, considering what is done by the Peninsula Company's steamers, and better there can hardly be, if I am to judge by the one that I came in from Gibraltar to London; and I think in this way the whole expenses would be covered. The estimate that I make of it comes to 230,146*l.* for the total expenses, and the probable returns 217,400*l.*, exclusive of all charges for the conveyance of specie, which I consider would be considerable.

973. Sir *John Hobhouse.*] That is to say, from postage and passengers and freight? —Yes; I have calculated the vessel at 800 tons, at 24*l.* a ton. Now, I venture to say, that that can be done for 200 rupees or 20*l.* a ton, if built in India, or they can be built at 20*l.* a ton in London; I have calculated it at 24*l.*; and I have calculated the engines, with iron boilers, at 12,000*l.* a piece. I do not consider that it is necessary to have copper boilers, they would add something to the expense; but even if you had copper boilers the whole of the vessel, such as I speak of, could probably be built for 31,000*l.*; that is the amount which Dr. Lardner has fixed for vessels of 1,000 tons, and with 250-horse power, which I consider unnecessary. The coals are the great expense, and that I have estimated on the average at 3*l.* a ton; I am perfectly satisfied that there is no way in which the East India Company have been more imposed upon than in the coals, from one end of the matter to the other. Whether it is the original cost, whether it is the freight, or whether it is the expenses of landing and re-shipping, I consider there is a very great saving to be made; and I will state one thing which appears to me to be the strongest possible proof of it: When the Forbes went, under the orders of the steam committee of Calcutta, to Suez, she was directed to apply, in case of need, to Colonel Campbell, the consul there, who is also agent to the East India Company, for assistance; in consequence of that she applied for coal, which she was out of at Suez, and there was a quantity of coal belonging to the Company, then at Suez, and our captain applied for that coal, and that Colonel Campbell would purchase other coal to replace it for the Company's vessel; Colonel Campbell did so. The Forbes left Suez with the Company's coal on board, which was replaced by Colonel Campbell at Alexandria; and we subsequently paid him 56*s.* a ton, including the price of freight and carriage, for that coal, which they have stated that they cannot lay in at less than 6*l.* a ton at Suez. Colonel Campbell, when I was in Egypt, repeated this to me again, and said, that in consequence of finding the great saving there might be to the Company for this coal, he wrote to them to say that he would undertake to get it laid in there at 3*l.* a ton at the most, and that he wrote repeatedly, I think he told me three times, I am sure he told me twice, and he said that no notice was taken of his letter whatever, and therefore he ceased to write anymore. It is very important upon this subject that the matter should be well understood by people here, for there is a delusion as to the expense of coals for navigating the Red Sea; one cannot suppose any wish upon the part of the Company that such delusion should exist; but there is an imposition practised upon them, by which the expense of steam navigation in the Red Sea has appeared so high that they have for some time objected to embark in it. I am satisfied 3*l.* a ton is the outside that it would cost.

974. Sir *John Hobhouse.*] Will you have the goodness to look over one of the papers which has been handed in by me, and to state whether the estimate therein given is not pretty much that which you think is a fair estimate. [*The paper referred to being shown to the Witness*]?—Certainly.

975. Will you look at another estimate also handed in, the expense of the Mediterranean steamers, which Sir John Barrow gave to the India Board, which does not include the first cost, nor does it include repairs, but it includes the wear and tear and wages and other portions of the expenses; you perceive that that amounts to 6,915*l.* Do you think that is about what might be fairly charged for the expense of a steamer?—I think in many respects it might; I have no scientific knowledge upon the subject. This estimate was made without communication with anybody, except that Major Head gave me the estimates which the provisional committee sitting in Crossby-square have made, and I compared them with this, and this is in some degree founded upon those estimates; but I know those estimates to be made by an exceedingly clever man, Mr. Morgan, who

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who is intimately acquainted with steam navigation in all its branches. My estimate is for a steamer larger than that of the Mediterranean steamer, both in power and size. The Medea is the foundation of my estimates, and I have taken it as near as possible to the Medea, which has precisely the same horse power, and only seven tons more than what I propose. I have estimated 10 vessels; I estimate the crews at,—400 *l.* for the captain; 200 *l.* for the first mate; 100 *l.* for the second mate; 60 *l.* for the third mate; 140 *l.* for the surgeon, who should also act as clerk; 600 *l.* for the engineers; 500 *l.* for the crew; and 300 *l.* for eight stokers; that would make 2,300 *l.* per annum for each steamer, for the wages alone.. The victualling I have reckoned at 100 *l.* a month, the stores at 50 *l.* a month, and the repairs at 100 *l.* a month, making 3,000 *l.* for each steamer; that is 5,300 *l.* for each steamer altogether. I have calculated crews for every vessel; I am not satisfied that that is absolutely necessary, because there never would be more than eight, according to this, running on the Indian side at the same time, and I am not aware that it is necessary to have a crew for every vessel, except such vessels as may upon an emergency be called into play. I have estimated the insurance upon half the capital, say 150,000 *l.*, at six per cent.; I have estimated it at that, because I know that three per cent. for six months is the usual rate at the insurance offices at Calcutta for a vessel that is considered a good average vessel. I have reckoned a fund to replace the capital in 15 years at 20,000 *l.*, and the interest on capital at five per cent. 15,500 *l.*; that makes the whole expense come to 167,146 *l.*, exclusive of the conveyance of passengers across the Desert, and of the eight coal depôts that it would be necessary to have. I consider that passengers may be conveyed across the Desert, distinct from their feeding, at 5 *l.* per head upon the average. There are eight coal depôts; I calculate at 1,000 *l.* each depôt, and 2,000 *l.* for agency in Egypt; that makes the whole expense amount to 185,146 *l.* upon the Indian side. The expense of the London steamers I have calculated to Alexandria at 45,000 *l.*, making the whole come to 230,146 *l.*; and the returns I calculate at 217,400 *l.*, leaving a small apparent deficiency; but, in fact, I consider the expenses to be somewhat overrated, and the probable returns (which do not include the conveyance of specie) to be under-rated. The returns I make in this way: I calculate in round numbers 1,600 passengers, which is one half of the whole number to the three presidencies, at 95 *l.* a head beyond their cost; that comes to 152,000 *l.*; that is to London. Letters, at 2*s.* each, I put at 15,000 *l.* I understand the Post-office has reduced it to 2*s.* 6*d.*; there is not much difference between 2*s.* and 2*s.* 6*d.*, but the lower they make the rate of postage, the greater it will be; and I think soldiers' letters ought to have the privilege of going free as they do at present, and that nothing ought to be paid to the steamer on that account beyond what the Government may pay for the convenience of their despatches. Parcels and periodicals I have calculated at 100 *l.* per voyage, which makes for 24 voyages in the year 2,400 *l.* They would be rather less than that one way, because there are not many coming from India to England, but as there are immense numbers going from England to India, the deficiency upon the one side would be made up by the greater amount upon the other. I have calculated 100 tons of merchandise per voyage, at 10 *l.* per ton, (exclusive of expense across the Desert,) 24,000 *l.* The expense across the Desert would amount to certainly not more than 2 *l.*, but I should think not more than 1 *l.* a ton, by conveyance by camels. The Government and Indian despatches, exclusive of the Malta, Gibraltar and Egyptian mails, at 1,000 *l.* a voyage, would be 24,000 *l.* I have not calculated for the carriage of specie on each side of the Isthmus, and I do not think there would be much across it, but between the presidencies I think there would be a considerable conveyance of specie. In the Forbes we carried two lacs to Calcutta, and we carried between three and four lacs from Madras to Ceylon; and I am perfectly satisfied that the whole of the specie which is sent now would go by those vessels. I do not agree with what was said by Mr. Peacock, that that ought to be given up to the captains of the vessels, or that the captains of the vessels ought to have anything whatever for the living of the passengers; they ought to have nothing to do with that. It is destructive of every comfort to the passengers, and destructive of every comfort to themselves to be placed in that situation. I saw it in two cases on board packet steamers, and I saw the great advantage that arises in a merchant vessel, where the whole of it is left to the steward; the captain receiving only a liberal salary from the owners, and the steward contracted for a certain sum. No persons on earth could be better fed than we were on board

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that vessel. I never had to ask for a thing, but I frequently had to refuse it when offered to me. On board the King's vessels I will say nothing, but that I found one of them exceedingly different. Nothing could be better than the arrangements on board the merchant steamer in which I came from Gibraltar for everything, both for speed and for accommodation, and for the comfort of the passengers in every respect. I never can speak too highly of the Iberia, her commander, Captain Middleton, and the steward and stewardess; she belonged to the Peninsula Steam Navigation Company. There is one great want at present in the Mediterranean steamers; there is no stewardess in any one of them, and it is impossible to expect that ladies will ever come a second time without them.

976. You say that you consider the arrangement for communicating with India only to Bombay as an arrangement that can refer solely to the conveyance of despatches and letters, and one that will be of no use except in that respect?—I did not intend to say that; I mean of no use to the rest of India. It will be of considerable use and advantage to Bombay; but there are very few persons who would take the trouble of going first to Bombay with the prospect of having, perhaps, a two months' voyage to get there from Calcutta.

977. For the purpose of conveying letters and despatches, you were understood to say that communicating by Bombay was a satisfactory arrangement?—Satisfactory, if we cannot get a communication to Calcutta, but not satisfactory as compared with that, because it increases our expense. I think it increases the delay; certainly it increases very considerably the risk.

978. You think it does increase the delay?—I think it does.

979. It is in evidence that letters go from Bombay to Calcutta overland by the ordinary post in the period of from 10 days in good weather to 16 under difficult circumstances; is not that the case?—I think not entirely; I never received a letter in 10 days, and I have received a letter in 20; not very lately, but I think in the course of the last year, (for I have had some little correspondence with Bombay,) before my leaving Calcutta; I have known it 17 days.

980. Is not it fair to say that the average runs between 10 days, the shortest, and 16 days, the longest?—Certainly; I think that would be a fair average.

981. Between Bombay and Madras, what is the average time of transmission by dauk?—I have not the same knowledge of that; I only received one or two letters from Madras while I was at Bombay; but the impression upon my mind is that it is about a 10 days' dauk.

982. Then, for the mere purpose of sending letters and despatches, you consider that the arrangement that has been now made is, as far as it goes, satisfactory?—As far as it goes; but that is not so satisfactory as what I have stated, upon another account,—that it is not so safe. I have received a letter from Bombay in a state that I could not read it, and I know that others have done so.

983. Is that an ordinary occurrence?—It is not a very unfrequent one; during the rains the despatches are floated across the Nullahs in many instances.

984. You are aware of the objections that have been made by Mr. Peacock to a monthly steam communication by the Red Sea?—I do not remember any specific objections which he made.

985. *Chairman.*] You heard that part in which he said that the present establishment was not sufficient for a monthly communication?—Yes.

986. Sir *John Hobhouse.*] Do you think the objections which he made to navigating the Red Sea were valid objections?—I think I ought to say, in fairness to Mr. Peacock, that I do not understand him to have made objections to the navigation of the Red Sea whilst I was in the room; but I cannot say that the whole of his evidence struck me as raising any valid objection whatever to a monthly communication by the Red Sea.

987. Then, so far as you are acquainted with the evidence given by that gentleman, you do not consider that it raised any objection that can be fairly called valid, to a mode of communication by steam by the Red Sea?—Not so far as I heard it.

988. Have you been at Malta?—I have.

989. Do you know the build and the power of two steamers that have been sent out, the Atalanta and the Berenice?—I heard them described the other day.

990. Are those vessels too large for communicating with and riding in the port or roadstead at Mocha?—I should say by no means; but there is this distinction to be always kept in view with reference to Mocha, there is an inner

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and an outer anchorage. The fact is, you can see across perfectly from one shore to the other, large ships lie in the outer roadstead or anchorage. The inner harbour is a kind of half-moon, formed by two points, on one of which is a castle, and upon the other of which there is a mount, which had formerly guns upon it for protection, within which they say that the water generally does not exceed about 11 feet; but so far as I saw of Mocha, I do not consider it necessary that vessels should lie within the inner anchorage; at the same time, I do not think Mocha a good port for a depôt.

991. *Chairman.*] In the examination of a former witness there are three places mentioned as depôts: the island of Perim, Mocha and Camaran; will you state which you consider the best?—My opinion is, that in point of situation the island of Perim cannot be excelled, because the ordinary passage lies within 100 yards of the shore, and it has, I understand, perfectly good anchorage; ships can lie in perfectly smooth water either on one side or the other. But I consider there is one very serious objection; there is no population on the island or in the neighbourhood, and any that you get must be brought there, either for particular occasions or for residence; besides which, there is no water, and in forming a depôt we must consider not only the convenience of arrival and departure of the vessels, but the living of those who are to form the depôt during the absence of the vessels; and I consider that Perim is very ill-calculated for the residence of any persons, from its want of water; but in all other respects I consider it exceedingly good. I had no opportunity of saying whether it would be healthy or not, because it is a remarkable circumstance that Mocha, without any appearance of reason for being unhealthy, has been found extremely unhealthy, particularly at certain seasons. I know one instance where two gentlemen were laid up with fever and ague at Mocha a considerable time, and it is considered particularly unhealthy for Europeans; fever, ague, and dysentery prevail there at certain seasons. I consider Camaran, in point of situation, to be nearly as good as Perim, and infinitely better, if we are to go to Socotra; in connexion with Socotra, I think it infinitely better than any of them; it divides the distance better; and as I understand, for I passed within sight of it, but I did not land upon it, it is an island supplied with good water, which very few parts of the Red Sea are well supplied with, and there is a very good harbour there; and I should say that it is an excellent place for a depôt.

992. Mr. *Bagshaw.*] It appears that in the despatch that the Bombay government, on the 16th of September 1836, addressed to the government of the East India Company, they state that the three last overland mails had brought despatches from London to Bombay in 58, 45 and 64 days; can you state whether they were conveyed from the Red Sea to Bombay in steamers or not?—No, I cannot; excepting only I think that one was and that the other two were not; but a good sailing vessel can make the communication occasionally much faster than any steamer.

993-4. You agree in the following sentiments of the government of Bombay; do you feel that the same sentiments prevail in Calcutta and Madras, or would prevail provided a communication were made direct to Calcutta, in the same way that it is projected now to make it direct to Bombay? It runs as follows: "We have witnessed the energetic impulse this early intelligence has given to the mercantile interest, and the unbounded satisfaction it has diffused throughout all classes of the community; it is indeed undeniable that a quick interchange of information is of the first advantage in commerce, and in the conduct of all public business, while it is equally true that the effect on the minds of those who serve the Hon. Company long and faithfully in this distant land is to deprive the painful feeling of separation from their homes and country of half its bitterness. We beg respectfully to press these reflections on the notice of your honourable Court, with our earnest prayer that you will ere long grant to India the much desired boon of frequent and regular communication with Europe, by the employment of a sufficient number of steam vessels for that purpose."—With regard to the satisfaction with which they would hail the establishment of a steam communication direct to Calcutta, I have no hesitation in saying that it would give the greatest satisfaction throughout India; there is the warmest interest felt in it throughout India, especially in Calcutta; but when I mention the satisfaction which would be given by a rapid communication, I should say that though it is a matter of great happiness to all persons that receive private letters to receive them rapidly, yet to merchants it is not so; it is regular communication

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that they want, and if they can have it speedily also, it is of course a great object; but if they are to have one come in two months, and another in eight months, it is an injury rather than an advantage to them.

995. Then you consider the benefits to be derived to India altogether by steam navigation would be very great?—Certainly, in every point of view.

996. Are the natives taking a very warm interest in it, and have they subscribed very liberally to it?—They have, very liberally.

997. Is not that a new feature in the native character?—Up the country it is, but not in Calcutta or in Bombay.

998. Do you think that many natives would come to this country, or send their sons here to be educated if we had a steam communication?—I have no doubt that some would in the first instance, and I have no doubt that many would ultimately; I say that rather advisedly, sepecially with reference to the parsees at Bombay, and not only parsees, but some others have expressed the same; I had occasion when I was there to see the schools which have been established by the education committee, and have had a great deal of communication wit the different parsee members of them as well as other persons, and they one and all expressed a great desire to send their sons to England, in connexion with thei education. There was a young parsee here last year, who had returned by way of the Red Sea, immediately before I was there; he had benefited very greatly; no person could see him or communicate with him without seeing what advantage he had derived from his visit to England; he was totally unlike all his countrymen in the place; he was coming again, and to be accompanied by another. I expect another parsee to arrive every day upon matters of business; not for the purpose of education, for he is a middle aged man; but I am perfectly satisfied that if steam communication were once established, and particularly if it were established in connexion with some system of education,—if we had some classes for their education in the universities of London, or wherever else might be thought proper, they would gladly avail themselves of it; particularly if honours and degrees here were made the foundation of promotion in India. It is only in that way that I think we can to any useful extent avail ourselves of the assistance of the natives. I am one of those that regret extremely that the experiment that we understood was to be made with reference to one native in Bengal was not ultimately tried; I can only attribute its not being tried to the Directors not feeling sufficient confidence in the natives. The only way that confidence can be created is, by drawing the natives to England, and giving them English education and English ideas.

999. A quick communication by steam you think would have the effect of producing that feeling among the natives?—I not only think that it would have that effect, especially after a while, but I think nothing else would: as long as the only communication is around the Cape, it is needless to hope for it.

1000. And you think that would greatly benefit India?—Very greatly.

1001. And you derive your experience from a considerable residence in the country?—From a considerable residence in the country, and very general intercourse with a very considerable number of the natives.

1002. Sir *John Hobhouse.*] Mr. Peacock stated that for the conveyance of passengers he was confident that the passage round the Cape was preferable to the passage by the Red Sea, is that your opinion?—It is decidedly not my opinion; and if Mr. Peacock were to reside in India as many years as I have done, and to take as many voyages round the Cape as I have, and one voyage through Egypt home, I am satisfied he would change his opinion.

1003. Did you ever hear such an opinion as that of Mr. Peacock's expressed in India, or is it a common opinion there?—I do not think that it is; I have heard a great deal of discussion upon the question of steam navigation round the Cape, having taken an active part in the steam committee of Calcutta; when Captain Young was there in the Fergusson, he had then a project of establishing steam communication round the Cape by vessels of 1,500 or 1,600 tons, and in consequence of that I had a great deal of communication with him upon the subject. It was thought by him that for the convenience of passengers it would be preferable; but I should say that is not the opinion of the people of Calcutta; the great advantage which it was thought would be derived from that was, their getting out goods in these steamers, which would carry very large quantities of merchandize, and that was the purpose of the communication round the Cape; I am sorry that Mr. Young, who is the brother of Captain Young, is not here, because he

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he is perfectly aware of all that passed upon the occasion; I think it was in consequence of the advices from Calcutta not being so encouraging, as they expected that the project was given up.

1004. Mr. Peacock has expressed a decided opinion that no return whatever could be procured from passengers; that is to say, that no portion of the expenses of such steam communication would be reimbursed from the payments which passengers would make; is that your opinion?—It is decidedly contrary to my opinion; I think it is erroneous upon the face of it; the more I examine it the more erroneous I consider it; and I will state why I consider it erroneous upon the face of it: if that were a correct opinion, what is it that maintains the steamer of the Peninsular Company to Spain, to Gibraltar, to Cadiz and Lisbon? is it passengers, or is it freight? They carry at the outside about 200 tons of freight; it must, therefore, be passengers, and passengers alone, who pay them. What maintains the large Scotch steamers; is it passengers or freight? If on a short voyage the passengers will pay so well, the payment will be proportionate upon a long one. It is utterly impossible to suppose that those steamers would have run the time they have, if they did not pay. There is another reason, that Mr. Peacock gave himself: that it was the usual course for the captain to pay the Company one-third; that I know to be a very common course, but in many cases he gives more than that; but if he pays them the third, the third must be profit at any rate; but if they can afford to pay one-third in a sailing vessel, where the voyages are very much longer, it stands to reason that they can afford to pay much more in a steamer, where the provisions that the passengers will consume are infinitely less than in the sailing vessel. If, therefore, 120*l.* is the price for a single passenger from Calcutta round the Cape, which you cannot take, upon the average, at much less than five months, if a man can afford for that price to feed his passengers handsomely for that five months, and to give one-third to the ship-owner, I should like to know what the steam captain could afford to pay to the owner to feed them for one month; it stands to reason that he could afford much more.

1005. You have stated that you consider the present establishment of three steamers insufficient for the monthly conveyance of mails backwards and forwards up the Red Sea, between that and Bombay?—I do.

1006. Do you consider that four would be sufficient?—I think four would be barely adequate; I think that five at least ought to be employed. If they were remarkably fortunate in not requiring repairs, and also fortunate in their voyages, and not meeting with detention at Suez, I think four might be able to do it, but not otherwise.

1007. Mr. *Mullins.*] Is it not your opinion that, taking into consideration the number of accidents that might occur from meeting with bad weather and other causes, it would be advisable to have at least six vessels, with a view to a regular monthly communication?—I could hardly answer that question to my own satisfaction without working it on paper, because it is easy to say that a steamer will do so much; but you must provide a steamer to go at the moment you want it, and you must make your calculations accordingly; and it is for that reason that I have said that it would be better to have two distinct lines from Calcutta to Suez, making them meet upon the Desert; and by the arrangement I have proposed there would be no detention either one way or the other. I consider that what I have stated is more than an adequate establishment for the whole communication, but I think I could not say that six were absolutely necessary without sitting down and working it, and seeing when the departures would take place upon the one side and on the other, and that that should form a component part of the consideration in answer to the question.

1008. Mr. *Bagshaw.*] And great attention should be paid to the monsoons?—That may make a difference of some three or four days at the outside between Suez and any port in India.

1009. Mr. *Mullins.*] Do you think it would be desirable to have a spare steamer?—Certainly, I think it would be desirable to have a spare steamer, because some repairs could not be done in time; if it was necessary to take out the boiler, you could not get it ready in a month, and consequently it is necessary to have one spare steamer at least.

1010. Will you state your estimate of the expense from Suez to India?—If the communication were only to extend to Alexandria or Suez, and yet to yield, which it probably would, 1,600 passengers, which would then only pay 70*l.* a head net profit, and 150,000 letters at one rupee per letter, the return would then

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then be, passengers, 1,600, at 70*l.* a head, 112,000*l.*; letters, 150,000, at one rupee, would be 15,000*l.*; freight, 100 tons per voyage, 24,000*l.*; parcels and periodicals, at 100*l.* a voyage, 2,400*l.*; Government and Indian despatches at 1,000*l.* a voyage, 24,000*l.* that would make net 177,400*l.* I have taken the sums upon which I make this calculation generally in the rough; I charge 100*l.* for a voyage from Calcutta to Suez; I charge 95*l.* from Madras to Suez, and 85*l.* from Bombay and Ceylon to Suez; that is 5*l.* more than what they pay at present; but I propose for that to take them across the Desert, so that it is in fact the same; and I deduct the difference for their living, that is 30*l.*, which the Calcutta passenger would cost the steward, that is, 1*l.* a head per day, and I am satisfied that 10*s.* is ample to allow them for eating, per head per day; but I wished rather to err upon the right side than upon the wrong side. I am perfectly satisfied that an adequate steward will provide everything which is necessary, or even desirable, for passengers at 10*s.* a head per diem; but I have in the calculation, for the sake of not having it said that I was understating it, allowed 30*l.* for a passenger from Calcutta. I have allowed 25*l.* for a passenger from Madras, and 15*l.* for a passenger from Ceylon and Bombay; I think that 15*l.*, upon the average, would pay the whole; that would make Calcutta, Madras and Ceylon, at that rate, yield 136,630*l.* towards the expenses. The Bombay passengers would yield only 28,360*l.* at the same calculation; but if they had every one of the letters at every one of the presidencies, the same as if the vessels went direct, you might add about 12,000*l.* more, which would make it about 40,000*l.* that they would yield, whilst the expenses to Suez would be 177,400*l.*, not the expenses to Bombay only. I have another calculation upon that; that shows that the three presidencies, including Ceylon, would yield 136,630*l.*, whilst Bombay would yield only upon the outside 40,000*l.*

1011. *Chairman.*] Would the communication with Bombay alone or the more extensive one leave the greatest amount of deficiency to be provided by the Government, and upon what data or calculations have you formed an opinion upon this subject?—I consider that the Bombay line would leave a considerably greater deficiency than the general one. Thus, having six vessels, which I have calculated would be necessary for Bombay, at the same rate as the ten vessels for the general line, at about 18,500*l.* per vessel, makes 111,000*l.* the cost of the six, whilst the returns would be only 40,360*l.*, that is, taking even that every letter would go that way that would go by the more extended line, leaving a balance of 70,640*l.* against the enterprise, whilst upon the other, I contend there would be no deficiency, or at most a very trifling one.

1012. Exclusive of the commercial advantages arising from a speedy and regular communication with India, do you consider that it will be productive of any political or moral advantage?—I consider that it would be productive of the greatest political and moral advantages; I need hardly say, that a speedy and regular communication is of the utmost importance in time of war, both for intelligence and for sending forces, which it would seem there would be no difficulty in doing by way of Egypt. We are at peace, it is very true, at present, but it will take two years to establish a communication even by the Company, as we heard from Mr. Peacock. If that is the case, who can say that we may not be at war in two years, and who can say from which side that war may come, or make any calculation whatever upon it; I think, therefore, it is of the most vital importance to establish it at once, that we may be ready in case of war to have the advantage over those that we may be at war with. I consider at all times that it would be of great advantage to the Company, in retaining more willingly their civil as well as their military servants there, and giving them a greater proportion of their services, which if it is an object to have at all, it is an object to extend. Every person that obtains a furlough now to the Cape might be allowed to return to England, which would only occupy him the same time. He should have reduced allowances upon coming home; but I venture to say, that every man that did not give up his allowances to come home, would take the option of having reduced allowances and come home, in preference to going to the Cape. By his so doing, the duties of his situation would be more efficiently performed, instead of an acting person being put in; he also could return again in as short a time. You might therefore cut off six months of the furlough at least of every person who now comes to England; you might also cut off some time from those who would otherwise go to the Cape; certainly those in the upper provinces, who have to come to Calcutta to embark, if they were allowed to go at once to Bombay and take their departure, would

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save time and expense also. I think there are very great advantages in encouraging occasional visits to England, by both the civil and military servants of the Company; they go out extremely young there; I will not say their education is not finished, but education is lengthened here till 23 or 24, in the case of young men that go to the universities; therefore, in the case of young men who go to India at about 19, and with military servants at 16, can it be said that the mind has been thoroughly formed at that age, and that it is not very useful for a young man to return again to Europe and to see something of European governments and institutions and customs; that is, I think, a matter of the utmost importance; it is matter of opinion, but that is the way in which it strikes me. I think also the advantage would be very considerable to the Company's army. There has been a great complaint in India that the army is not in the same state of subordination as His Majesty's forces in England. It is not for me to say whether that is true or not; but I am perfectly satisfied that it is very desirable that English ideas upon that as upon every other subject should be renewed from time to time by occasional visits to England. I am perfectly satisfied also that it is of the utmost importance to the efficiency of the King's regiments; all officers almost who have any means besides their pay sell out of a regiment ordered to India, because they consider it a perpetual banishment for life, and that their life is insecure; but if they were placed within two months' reach of home, I have no doubt that very few officers would sell out. I believe that it is generally considered that the better officers, certainly those who have most hope of promotion, and who have most to push them forward, sell out; but it is desirable to keep those persons in the army, and to send a regiment out with its full complement of old officers as you do with its men. I am quite satisfied that this intercourse will revive and increase the attachment of all Europeans to their native country; and that it will create an intercourse and connexion between the natives and England which will be highly advantageous both to the one and to the other. I am of opinion also that it will add very much to the advantage both of the one and of the other that the resort of Europeans should be encouraged instead of discouraged. Supposing it to be true that Europeans frequently misconduct themselves towards the natives (which I will notice shortly), I would ask whether it is not arising greatly from the distance they are separated from their native country, from their native notions, and from any means of appeal to or control from their native country? But I say that it is not true generally. I do say that there are no set of men that have been more generally belied by reports than the indigo planters of Bengal, so far as I am acquainted with them. I do not pretend to know them much more than in parts of the districts of Jessore, Bengal, Kishnegore and Midnapore; but I am satisfied that they have contributed greatly to the prosperity of the country. Almost every man, not in the Company's service, depends upon his own personal exertions for making money, which he can only do in connexion and intercourse with the natives; and is it to be supposed that they will make enemies of the very persons upon whose assistance they depend for making their fortune? I am satisfied that they do no such thing, but that, on the contrary, they are a protection and a blessing to them, both in periods of sickness and distress, and when they are oppressed by others. It is not the general character of Englishmen in India, any more than in other places, to oppress everybody that they come across. There will be tyrants in every place, and persons will abuse power and authority whenever they have it; but it must be recollected that it is the European who is out of the Company's service that is generally considered as a sort of rival of, and looked upon with jealousy by, the civil servants, to whose jurisdiction he is amenable there, and who are just as likely to abuse the power vested in them, which is very great, as the less powerful indigo planter. The difficulty would be for the European rather to get justice than for the native, because the prejudice would run against him, with the single exception of persons being upon terms of great intimacy with the civil magistrate. It was stated the other day by Mr. Peacock that he thought it a disadvantage in this respect. I think it is not a disadvantage, and I think he is mistaken upon that, as he was upon some other points with which he is not personally conversant, and which he takes merely from what he has heard from others, and that not always the purest source. I think myself there is a difficulty frequently for an European opposed to the natives to get justice, and that it is increased by the power which is given to the civil servants to decide, as we are told they are to decide merely according to their notions of equity and good con-

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science, which I do not consider is what they have a right to do; but I do not enter into that question. If they have the power of deciding where Englishmen are concerned, according to their own arbitrary notions of equity and good conscience, as Mr. Peacock has said, giving an interpretation of their own of English law—not such an interpretation as an English lawyer would put upon it—those notions will be relaxed or tightened according to the predilection which the distributer of justice may feel towards the one party or the other. I am perfectly satisfied that everything whatever that shortens the distance between India and England, and brings India nearer to the public of the mother country, will supply to a great extent the want of a public in India; for there is no public in India, and there is no power of control by public opinion over those placed at a distance from the presidency, nor even over those that are under the very nose of the presidency. I am quite satisfied that it will tend to check the tyranny and oppression which is imputed, I believe unjustly, to Europeans in India. I think it will check it on all sides; that it will promote industry, promote justice, and promote good government. I am quite satisfied that that to a very considerable extent will be the operation of steam navigation, and that the natives think so. It was stated by Mr. Peacock that it would bring home complaints, or those who fancied they had grievances to complain of, and he mentioned that as an objection. I consider it just the reverse, and it is one of the grounds upon which I should say it ought to be promoted, because it would then comparatively bring justice home to every man's door, or at least to every man's reach; and the more you can do that, the more you answer the purposes of good government; and, consequently, I think it is a strong ground why it should take place, instead of an argument against it, though I am aware that that has been considered a very considerable and strong argument against it, and I believe it to be one reason why it has been delayed so long, but surely it is an insufficient one, or rather a strong reason the other way. I think also that the vices of the Indians are greatly produced by their never having had anything but Asiatic education and Asiatic intercourse. Their vices are generally deceit, fraud, perjury and cunning, which are the necessary consequence of ages and centuries of misgovernment and of tyranny. It was the only mode they had to get rid of the tyranny by which they were ground down. When we talk of the tyranny of Europeans, I should like to know whether the worst of it is a tenth part as bad as the tyranny of a bad zemindar. I could name innumerable instances in which the tyranny of zemindars is a thousand times worse than the tyranny of any European; and the more you give them intercourse with Europeans it will give them juster notions on the policy as well as propriety of good faith and honesty. With reference to the moral effects of the measure, I have already answered that, because I consider it principally with reference to education, which I think would be very considerable, particularly with reference to medical students. I am satisfied that medical students, persons who have given themselves to a study foreign to the habits of the natives, will gladly seize any opportunity of improving themselves in it by coming to England, and I think that the great body of students in the Medical College in Calcutta, which is one of the best institutions that has ever been established there, would in all probability come to England to study, and I think they should be encouraged to do it. I am satisfied that one sensible man who has been educated and has associated freely with persons in England would do more to promote the welfare and happiness, and to change and expand the ideas of his countrymen, than a hundred of those that have received the best education that India can afford. I think it would be well that whatever is done should be done in conjunction with the institutions that have been established at the different presidencies for the education of the native population. I have no doubt that in conjunction with steam communication, that would form a strong power for humanizing India.

1013. Mr. *Mullins.*] You wish it to be understood that all the advantages you have just been detailing are likely to arise from a general intercourse by steam with the different presidencies of India, not by restricting it to one presidency alone?—I think that the benefit will be far greater by extending it to all, because it will create a degree of emulation between different presidencies: one man that goes from Bombay will probably stimulate three or four to go from Calcutta, and the same as to the others. I think it is not only desirable for that purpose, but because I think it is the only way by which a great part of the expenses could possibly be paid, for which I have given a reason. I am certain

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that the greater portion will be paid in less than three or four years, if it is once established to all the presidencies.

1014. Can you state what are the prices of the best Birdwan coals, and how many maunds there are to the ton?—I calculate 28 maunds to the ton; I think the price in Calcutta is six annas a maund. The Company contracted for five annas a maund for the best Birdwan coals. The price rose last year, in consequence of the great deficiency of it, and it is at 12 annas a maund, at which I myself as an executor sold coals to the Company, but the price of raising coals at present is somewhere about from three to four annas a maund, but the coal they are working is, as it was here originally, the upper vein of coal, not the lower vein of coal; the lower vein of coal is always superior to the upper, and I make no doubt, that if there was a great demand for coal, so that it would pay for the working of an additional depth, they would procure as good coal as the general run of coal in England. There is great difficulty in getting the coals down from Birdwan. The Nullahs are only navigable for three or four weeks in the year, and during that time they are obliged to collect all the boats they possibly can, to bring all the coal they have collected at the depôt down to Calcutta. The consequence of the scarcity is, that the price is very much enhanced beyond what it would be if there was a considerable demand and additional facilities given.

1015. Have they come to any depth in any of the coal pits?—Nothing that would be considered depth in England.

1016. If there was a regular communication by steam between the Red Sea and India would not the commerce very much increase?—I am perfectly satisfied that it would very much increase. Every article of English or Indian manufacture of which I would dispose was readily purchased in my route. It would not do, on account of the expense, for the more bulky articles, but Persian carpets, the inferior kind of jewellery and beads, broad cloth of the coarser kinds, the coarser kinds of cotton, and things of that kind, would all, I have no doubt, be sold readily, to a small amount, in the Red Sea, and many things would be returned. The steamer would be capable of bringing home many drugs, which are supplied by the island of Socotra itself, to a great quantity; and I think also that they might bring from Calcutta a considerable quantity, even every voyage, of rice, which sells at a high price in the Red Sea. The price of rice in the Red Sea is from four dollars to seven dollars a bag. I myself sold some at 4½ dollars at Mecca, which had cost me three rupees a bag at Calcutta.

1017. You have no doubt, therefore, there would be ample freight for spare tonnage in the large steamers?—I have no doubt there would; but I think also from London and from Alexandria, receiving there that which came from Marseilles; I think millinery from France, books also from France, books and periodicals from England, plate and jewellery from England, silks and ribbons, and all things of that kind, from France, to a very considerable extent, would be taken. I think articles of dress from both countries would pass backwards and forwards; shawls from India, and articles of value, and raw silk; and opium from Egypt might also pass, to a small extent, but not to a great extent, because the direct trade in opium lies out of the route to Calcutta. Singapore is the first port for the sale of opium near the route.

1018. Mr. *Bagshaw.*] What is the situation of invalids at Calcutta who want to go to sea in a south-west monsoon, and would it not be very much ameliorated in the event of steamers going regularly?—I think decidedly; there is frequently difficulty in procuring a passage either to the Cape or to England in the south-west monsoon, and the passage at that season is very bad for an invalid; the passage down the bay is exceedingly tedious with an adverse wind and a high sea; the continual wet and heat are exceedingly prejudicial.

1019. Mr. *Mullins.*] Do you think it would be likely that any number of passengers would ever pass by land between Bombay and Calcutta in the event of there being steam communication by sea?—Not any great number; it would be confined to those whose business call them there.

1020. You do not think that ladies or their families would venture to cross to Bombay, or that it would be possible to make the journey safe for them?—Certainly not; it is quite impracticable by land for ladies. Perhaps a lady in strong health would be able to do it, but not without great inconvenience. At the season of the year that is best for travelling, as to the road, it is worse with regard to heat; you can only travel by night.

Veneris, 30° *die Junii*, 1837.

MEMBERS PRESENT.

Mr. Bagshaw.
Lord William Bentinck.
Mr. Crawford.
Sir John Hobhouse.
Mr. Mullins.

LORD WILLIAM BENTINCK, IN THE CHAIR.

Captain *James Barber*, called in; and Examined.

Captain *J. Barber*.

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1021. *Chairman*.] I BELIEVE you were in the East India Company's marine service?—Yes.

1022. How many years?—Twenty-three years in the Company's service.

1023. You also commanded a private ship for several voyages?—For 14 voyages; after that I was 23 years in the Company's service, and 12 years in the command of a ship; making 35 years in the whole.

1024. How many voyages have you made altogether?—Seventeen.

1025. You of course are very well acquainted with the Bay of Bengal?—Yes.

1026. Had you an opportunity of seeing the Atalanta and Berenice before they went out?—I had; I visited both ships.

1027. Do you think those vessels would have any difficulty in making the voyage from Calcutta to Point de Galle in the south-west monsoon?—Not the smallest.

1028. You know it often blows very strong up the Sand-heads, between that port and Point de Galle?—It does; but it is not a continuous gale. There may occasionally be gales, when it would be imprudent for a vessel coming from Bombay or Calcutta to attempt to cross; but that would only last for 24 hours, and very seldom occurs.

1029. Do you know the length of time the sea breezes prevail along the rest of the coast?—Yes.

1030. Then there would be no difficulty in a steamer, which would keep close to the coast, making that passage?—Not the least.

1031. Are you acquainted with the Point de Galle harbour?—I have been cruising off the west coast of Ceylon. I am not much acquainted with the harbour itself.

1032. Then in going from Galle to Socotra there is a strong current going round Dundra Head; do you think a steamer would have any difficulty in over coming that current?—Not the smallest. The current at the extreme that I have known it runs 50 miles in the 24 hours, and in the south-west monsoon, I should say decidedly the preferable passage would be to go through the one and a half degree channel. It would expedite the passage to Socotra, because the boat would make the channel, and have a strong south-west wind to carry her through, and there would be no difficulty in any part of the passage.

1033. Then if the machinery were to be damaged in any way, she could go under sail to Socotra?—Yes.

1034. Were you ever at Socotra?—I never was at the island; I have been in sight of it.

1035. Where were you coming from when you were in sight of it?—I was going from England to Bombay.

1036. Should you apprehend there could be such a sea about Socotra, which is about 75 miles in length, as to prevent the approach of a powerful steamer to its harbour, or to the roadstead, where it would take in its coals?—Decidedly not.

1037. I believe you are at present an East India agent?—I am.

1038. Have you a reason to know that there is a great desire on the part of Indian officers to go by a steam communication if it were established to India?—There is not a day passes but officers in the civil and military services inquire at my office how the thing is progressing. They would go by it immediately it was established. I also hear of it at the Oriental Club frequently.

1039. Then you think, if there were only a sufficient number of good, convenient and powerful steamers, that route would be generally taken?—Yes; no doubt they would be more than filled.

1040. Do you think if a steam communication with India were established it could be extended to any part of our colonial possessions to the eastward of India, with New South Wales for instance?—I have no doubt of it. I have been in communication with some of the first Australian merchants in the city, and they are exceedingly anxious to have this passage established to Calcutta, intending themselves to take on the communication from Ceylon to Australia, as they are constantly complaining that the return of letters from Australia occupies so long a time, although they go to Australia with pretty fair rapidity.

1041. Do you mean the communication to India, or the communication to England?—The communication to England. There is at this time a company formed for communicating with Ceylon, anticipating the main stem would be carried out.

1042. Is that company actually formed?—Yes, and the boats are actually built.

1043. If a communication were made to Point de Galle, it would be more convenient to the Australians to come to Point de Galle than to Calcutta, as it would be half the distance?—Yes, and the communication would be equally convenient with Sumatra, Java, and the whole of the Australian Archipelago.

1044. Mr. *Mullins.*] Between what points of Australia do they propose a communication should be established; you do not mean New South Wales?—At Melville Island; that is the northward point. Our calculations and contemplations were to carry it to Melville Island, and to have a depôt there, leaving them to form local companies in Australia to carry it to other points.

1045. Then your plan would not go beyond Melville Island?—No; but upon consulting with the Australian merchants upon that plan, they were amazingly pleased with it, and said they would not trouble us to go so far to the eastward as to Melville Island, as they would themselves carry it further.

1046. *Chairman.*] Do you think a mere communication to India, in the first place, would be sufficient, allowing the comprehensive line afterwards to grow out of it?—No; on the contrary, I think it will be a marplot to the comprehensive plan being established, for the very great expense which must necessarily be incurred in carrying steam communication to Socotra alone, and from thence to Bombay, unless met by the revenue which can be derived from the comprehensive line to Madras and Calcutta, will so far exceed the revenue to be derived from the transit of the letter bags, that I should contemplate the speedy abandonment of the plan, the receipts falling so far short comparatively of the expenses.

1047. Then you conceive the comprehensive plan would be, in fact, much the cheapest?—Decidedly, and the only one that would insure the permanency of steam communication with India.

1048. Have you made an estimate of the number of steamers necessary for the comprehensive plan, and the expense of the whole establishment?—I have.

1049. Will you state it?—I propose there should be four efficient boats, of 600 tons, and adequate power, which would cost 100,000 *l.*

1050. What tonnage and power would you give to each steamer?—Six hundred and fifty tons measurement and 180-horse power.

1051. Mr. *Mullins.*] Why have you thought of limiting them to that power?—At starting, or during the first five or six years, I consider those boats will be of sufficient size to meet the wants of the traffic. To have them larger would be more expensive.

1052. But

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1052. But it does not appear you have looked to the obstructions from the wear and tear of the machinery and the want of expedition?—Yes, I have made allowance for those obstructions from the wear and tear of the machinery, which if you had larger sized boats, would increase the expense considerably.

1053. Are you not aware that the larger the size of the boats, the less wear and tear there would be?—No, it is quite the contrary; I believe the wear and tear increases in proportion to the size. I propose that those four boats should be employed in rotation, as follows:

No. 1. To leave Socotra January 1; arrive at Calcutta January 19.
No. 2. To leave Socotra February 1; arrive at Calcutta February 19.
No. 3. To leave Calcutta January 1; arrive at Socotra January 19.
No. 4. To leave Calcutta February 1; arrive at Socotra February 19.

Thus, in succession, four boats will ply between Socotra, Ceylon, Madras and Calcutta; steaming at most (making every allowance for monsoons, &c.) 114 days in each year. And in the event of accident to a boat, by this system, the three would keep up the communication during the repairs of the inefficient boat.

1054. Have you ever considered how many days' work it would be advisable that a steamer should have during each month in the year, looking to the necessity of repairing, overhauling the machinery, and so on?—I have stated that each steamer will be in work 114 days each year.

1055. Do you consider that a steamer could work 114 days a year, and still be preserved in that efficient state of repair which is necessary at all times for the safety of the vessel and the passengers?—I think so.

1056. Have you had much experience of steamers?—I have had very little practical acquaintance with steamers; but I have turned my attention to the subject for a length of time past, for the last 14 or 15 months pointedly and decidedly, and from all the inquiries I have made, I think that a steamer may be kept in work for 114 days a year.

1057. Have you ever taken a long passage in a steamer?—No.

1058. What is the longest passage you have taken?—The longest passage I have taken was from London to Ostend.

1059. *Chairman.*] Will you state at what you estimate the expenses of that establishment?—I estimate the annual disbursements as follows:

DETAIL OF WAGES.

		£.
Captain		400
First mate		150
Second mate		100
Surgeon		100
Carpenter		80
Gunner		50
Steward		50
Serang		30
Eight Lascars		96
Six Lascars		48
		1,104
First engineer	£. 300	
Second engineer	200	
Third engineer	100	
		600
Twelve stokers, at 2*l.* per mensem per man		288
	£.	1,992 × 4 = £. 7,968

VICTUALLING.

Captain, table allowance to provide table furniture of all kinds, and to mess mates, surgeon, chief engineer and steward		600
Carpenter, gunner, two engineers		238
1 Serang 14 Lascars 12 Stokers		162
27	£.	1,000 × 4 = £. 4,000

Captain to be allowed 5 rupees per mensem.

(*continued*)

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	£.
Coals	20,000
Depôts and contingencies	3,072
	35,040
15 per cent on 100,000*l.* for wear and tear, and to keep up the boats	15,000
£.	50,040

I estimate the income as follows:

	£.
Passage money to be taken:	
£. 50 - - 10 passengers to and from Calcutta, monthly, 240	9,600
£. 40 - - 10 passengers to Madras coast, 240	8,160
£. 30 - - 5 passengers to Ceylon, including the Straits, 120	3,000
10 native passengers, 400	4,000
£. 20. from Socotra to Suez, 600 passengers annually, thus drawn into the main trunk, to Suez from Socotra	8,400
£.	33,160

	£.
Profit on passengers, allowing the captain 10*s.* for victualling per diem	33,160
20,000 additional letters (if this route be adopted), at 2*s.* 6*d.*	2,500
50,000 periodicals, &c. at 1 *s.*	2,500
100,000 newspapers, at 6*d.*	2,500
200,000 letters, additional postage, at 1 *s.*	10,000
Government despatches to Ceylon, Madras and Calcutta, from England and intermediate places	5,000
Law-deeds, parcels, invoices, samples, jewellery, treasures, &c.	5,000
£.	60,660

I consider the number of passengers to be much underrated, if the many that will flow into this stream of intercourse (if it be opened) from the Straits, China, Batavia and Australia be taken into calculation. Letters, periodicals, &c., from the foregoing places will also follow in proportion.

I have thus shown that carrying out the comprehensive scheme will, even at the commencement, yield a profit, in part discharge of the large disbursements that must unavoidably attend the accomplishment of the measure to Socotra; it will, in short, insure permanency to the undertaking; while, on the other hand, if a contracted plan be adopted, however effective in itself, I can see the time when it will be abandoned on the score of expense, for the charge will be considered far beyond the advantages to be derived. In carrying out steam communication to India, Mr. Peacock has wisely recorded, "Steam navigation would require to be carried on on a large and efficient scale. Between doing it efficiently, and not doing it at all, there seems to be no advisable medium."

1060. At what rate have you calculated the coals per ton?—Fifty shillings; and I should be glad to supply them for the money.

1061. Mr. *Mullins.*] What depôts do you take into consideration when you give that estimate?—I took Socotra and Galle. I should have depôts also at Trincomalee, Madras and Calcutta. I have looked a great deal at this measure, and I do think Trincomalee should be the general depôt for steamers upon the comprehensive plan. You there meet with His Majesty's ships at all times in case of need or necessity. You could repair them there tolerably well, and it would form a magnificent harbour for half the shipping in the world, if you could get them there.

1062. *Chairman.*] Would you have any depôt in the Red Sea?—Yes, decidedly.

1063. Mr. *Mullins.*] But the four vessels you speak of are supposed to go merely from Socotra to Calcutta?—Yes; supposing you carry it to Socotra, as I suppose you must do, that establishment is to carry it from Socotra to Calcutta.

1064. How many vessels would you have from Socotra to Suez?—Three.

1065. That would be seven from Suez to Calcutta, upon the comprehensive plan?—Yes; and two from Bombay to Socotra.

1066. That would be nine altogether?—Yes.

1067. Should

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1067. Should you think it advisable to have all these vessels of the same size, or of different sizes?—The four from Socotra to Calcutta I would have of the same size in all respects; the two from Socotra to Bombay of smaller dimensions; and the three from Socotra to the Red Sea of larger size, and larger power.

1068. Why have those from Socotra to Bombay of smaller dimensions?—The capacity they would require would be less for the conveyance of the packets and for passengers.

1069. Have you considered the monsoon seasons?—Yes; I consider that three months in the year the Bombay packet would not go by the steamers, but join the Calcutta boat at Galle.

1070. Then you think being of smaller size, she would be able to make the southern passage as well as a larger one?—I have no doubt about that; she will get down the coast under canvass without steam.

1071. And still preserve a regular monthly communication?—Yes.

1072. *Chairman.*] Both in the north-east and north-west monsoon, one of the passages, where it is favoured, will be made under sail?—Generally; almost always. Sometimes the north-west monsoon fails, and there is no wind; but, generally speaking, she could do so.

1073. That of course would produce considerable saving of fuel?—Decidedly; it has been taken somewhat into consideration in the estimate of expenditure, but not sufficiently; I thought it better to make a calculation that would stand the test.

1074. You allow only 10*s.* a day for victualling the passengers; upon what data have you fixed that?—I have carried passengers for 14 years of my life, and I fancy I have generally provided them as well as other ships of my class have done, and I consider 10*s.* a day is an abundance at the present time. And I may mention that in this estimate I have put down the commander at 400*l.* a year; but I think I should give him a small per centage, to make it a desirable situation to have, and then you would have a greater supply of fit men.

1075. Supposing the steam communication to be completed between India and Suez, will the Mediterranean packets form a sufficiently continuous chain to England?—I am decidedly of opinion they will not; there are many objections to them; they have neither speed nor capacity to perform properly the office they now undertake; if burdened with an additional charge from India, they would have less speed, and I think not be able to carry the number of passengers, parcels and packets, which would arrive to be put into them. Coming by the Mediterranean packets, also, you would have to perform quarantine at Malta, which is a decided objection. I think, in the aggregate number of passengers from India, it would make a difference of 1,000 a year at least, and it would draw some of them into the French route. Now, I think if a boat were to leave Alexandria, and come to Falmouth or London, or any other part which might be fixed upon, if they had to perform quarantine, which would be at most for a week, where they would be within reach of their friends, you would draw from India a larger proportion of passengers than you can by any other means; and, moreover, you would have greater security for the conveyance of treasure, jewellery, &c., as well as your own despatches; any valuable property which might be committed to the charge of those steamers from Calcutta would be brought to London with greater despatch and greater security, by having a continuous chain of communication for that, and that alone.

1076. Mr. *Mullins.*] Do you not also imagine it would encourage a great number of persons residing in this country to go out to India, who would not form such an idea at present?—Decidedly. In my communication with families connected with the East, they have told me they would go to Egypt, and that would bring individuals from India to meet them in Egypt. They would stay a month visiting Upper Egypt, and after seeing what was to be seen there, they would return to England again.

1077. *Chairman.*] I suppose you know better than anybody that the greater part of the homeward cargo from India generally consists of children?—Yes.

1078. It would probably be an inducement to send them by the Red Sea, if there were a continuous route to London?—Yes; that is exactly what I wish to state.

1079. What is your opinion of that?—I have already stated it would make a difference of 1,000 passengers a year in the aggregate, and the attempt to do it on any other plan would entail a considerable expense, which you could not meet;

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meet; but if it were done upon the comprehensive scale, with one continuous chain of packets throughout, I am confident it would not only pay itself, but would be a source of profit to whoever undertook it.

1080. Do you think there would be any cargo to England?—I think there would be samples, measures and light cargoes, such as cochineal and other things. I am not an advocate for making packet boats cargo boats, for you obstruct their speed immediately you bring them down in the water when they start, and when you lighten them too much they have not the same power in the water.

1081. But there are light articles, such as millinery, which might be sent from England?—Yes.

1082. And there may be valuable articles of small bulk?—Yes, valuable articles of small bulk, and light bulky articles will go by that route.

1083. Mr. *Mullins.*] In those light vessels you have been speaking of, how many tons of cargo do you suppose they could take, independent of the passengers, their luggage, and fuel?—I think they could take 50 tons of light goods.

1084. How many passengers should you calculate upon?—Those boats are only calculated for 40 passengers.

1085. Is it your opinion they could take 40 passengers, with every convenience and comfort which passengers going a long voyage of that description would require?—I think they could, as they would not have them so great a space of time on board. That number is far in excess of what they would have for some time. The calculation made for passengers going from Socotra to Bombay is only ten, though the boats would have a far greater capacity.

1086. Is it your decided opinion that a vessel of this size would take a sufficient supply of coals, and still retain space for 50 tons of light cargo?—Yes, I think so.

Major *Charles Franklin Head,* called in; and Examined.

Major *Charles F. Head.*

1087. *Chairman.*] HAVE you given your attention to the subject of steam navigation to India?—I have given a great deal of attention to it for the last six or seven years. I examined the proposed route six years ago, and on my arrival in England I found many persons desirous to communicate on the subject. I was requested to make out a report upon the practicability of the plan, which I did. I presented it in 1833 to the India Board, to the India House, and also to His Majesty; and at a personal interview His Majesty wished me to continue my attention to the subject. From time to time I communicated in reference to it, and have various papers which passed between myself and the Government.

1088. What is your opinion upon the subject of a continuous communication?—My opinion is that it is quite practicable to any port of India to which it may be desirable to go. I expressed a detailed opinion before a Committee of the House of Commons in 1834. At that time I brought forward a good deal of data, bearing out the grounds upon which my opinion was formed, both in respect to weather and to stations and distances, and the power and capacity of steamers. I thought it was quite practicable, and since then many favourable circumstances have confirmed that it is so. At that time the Island of Socotra had not been surveyed. I had been there, and made a report from personal observation; the Island of Camaran had not been mentioned. I had been there also and spoke from personal observation; those two stations are now recommended, having been surveyed. The Red Sea had not then been surveyed, and now a complete survey is published. The Committee in 1834 made a favourable report, and it will be thoroughly borne out by subsequent information.

1089. Sir *John Hobhouse.*] With respect to the navigation of the Red Sea by steam-boats?—Yes; in fact, in every particular.

1090. During all times of the year for a monthly communication?—Yes, this may be done.

1091. *Chairman.*] Are you of opinion that Socotra and Camaran are good places for depôts?—I consider they are the best depôts we can have; there are several other places which may be made depôts, but I consider Socotra and Camaran are the best, from various causes.

1092. Were you ever in the Island of Perim?—I was on shore at the Island of Perim.

1903. How is that calculated for a depôt?—The position of it is very well calculated

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culated for a depôt; but I consider the Island of Perim has objections. In the first place, it is uninhabited, and is a sandy low island, with brushwood and bushes upon it. As to water, I do not know whether it produces any or not. It has nothing to recommend it for a depôt but its position, and I think its position is not so favourable as Aden, situate also at the entrance to the Red Sea, or not more favourable.

1094. Have you ever landed on the coast of Africa near Cape Guardafui?—No; I have read with a great deal of attention Captain Owen's reports of the East Coast of Africa, and Captain Boteler's, who surveyed it; and from their reports there might possibly be a good position found upon that coast, both for trade and occupation.

1095. Have they stated any particular point where it could be established?—No, they have not; I do not think their survey extended so far as Guardafui.

1096. Then it is a mere matter of speculation on their part?—Their report extends to the southward of that; and they remark on the trade that is now going on there, and upon the probability of an increased trade, and upon the injury of our not looking into the thing more than we do. The Americans hover about those parts a good deal; a number of their vessels touch there. Captain Boteler remarks that the foreigners are possessing the trade which ought to be ours; they are increasing that trade to a great extent.

1097. But they have not pointed out any harbour or roadstead that is adapted for a depôt?—Captain Owen has given a map of the coast, but I have not a recollection of it. I think, however, if there was a harbour found there, it would not be so useful to us as Aden or Socotra. They are a wilder set of people on that coast; on the Arabian side they are extremely friendly and well-disposed. I have heard Maculla, the sea-port of Abyssinia, mentioned as a depôt, which would be a very useful one.

1098. You do not think it would be so useful as Socotra?—I think Aden and Socotra would be more useful. I more particularly mention Socotra, because commerce would grow around that depôt, and there would be no occasion to change at a future time.

1099. Have you formed any plan for completing a continuous communication?—I gave in a paper the other day, which I believe is now before the Committee.

1100. I see you propose that the line should begin from England to Alexandria?—I do, for many causes, but more particularly in reference to economy; and as this measure has been kept back on account of expense, I fear, if it is commenced in a partial or imperfect way, it may be lost to the public again, and a much greater objection may be raised against it than now exists. Therefore it should be founded on a plan to combine all sources of profit, and be connected with commercial and Post-office arrangements. With the present Post-office regulations it will not make a very ample return; for instance, I made an application myself to a stationer to send a pamphlet to India, and was told it could only be sent as a letter, so that of course it was not sent at all. A monthly magazine, I believe, costs 25 *s.* through the Post-office, which is tantamount to a prohibition. Parcels are more out of the question than magazines, as they are also paid by weight.

1101. They will not receive parcels on board the Post-office packets?—I made the application, and I think it desirable to put the Committee in possession of the above fact, for it is a point upon which the Indian community dwell as one of great importance, being permitted to have publications and parcels of different kinds transmitted by this route.

1102. You mean periodical publications, and so on?—Yes; also invoices, accounts current, law papers, &c.

1103. You do not mean pamphlets and things of that kind?—I mean to include all monthly and periodical publications.

1104. They wish to be permitted to transmit them by mail?—By the packet, at a certain fixed price; at present they only transmit them as letters.

1105. You do not mean that they should go in the letter-bags?—No; but that they should go by the same conveyance.

1106. That they should be received into the packets at Falmouth, to be conveyed by them?—Yes.

1107. Sir *John Hobhouse*.] Is the Post-office to be the department which is to take upon itself the responsibility of that conveyance?—I do not know who would be made responsible for the conveyance.

1108. The King's packets are restricted from taking any parcels?—Yes; they do

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do not take any parcels for India, because, I am told, they consider that letters may be enclosed in parcels, and therefore prohibit them altogether; but the transmission of periodicals is of great importance, and with respect to the steam communication now established upon the Ganges, there are no persons feeling the benefit of it more than the publishers in Calcutta, and there is great benefit derived from the circulation of periodicals and publications throughout India by internal steam communication. That was established not without a view to its being finally connected with steam communication with England. They look for a cheap transmission of monthly periodicals and newspapers and various other things throughout the country. I believe the West Indies are permitted to have parcels sent out by the packets. The bearing of this is that the merchants in London consider that upon establishing this communication with India, at least 15,000*l.* a year would be contributed towards the expenses, by the transmission of periodicals, invoices, law papers, &c.; therefore if this sum of money were received on that account, of course it would relieve the public of a like sum above what is necessary to open the communication above postage alone.

1109. How many vessels do you propose to employ?—I propose to employ five steamers between England and Egypt, each vessel having between 70 and 80 days' steaming a year. All the work on the Indian side would be performed by 10 steamers, each having from 70 to 80 days' work a year. It is a very curious fact, that in carrying the communication to India, if you divide the distance into three parts, the first being from England to Alexandria, the second being from Egypt to Bombay, stopping at Socotra, and the third being from Socotra to Calcutta, there is so little difference between the three distances; the first portion of the work on the Europe side of Egypt requires 24 voyages, of 3,100 miles each, making the distance to be run 74,000 miles annually; the second portion, between Suez and Bombay, includes in 24 voyages 73,440 miles annually; the third portion takes, between Socotra and Calcutta, for 24 voyages, 74,640 miles annually; so that in any one voyage there is not a difference of more than 50 miles in distance.

1110. I believe that the inland voyages tally very much; for instance, it is nearly the same distance from Calcutta to Madras as from Bombay to Ceylon, and it is the same distance, again, from Calcutta to Galle?—Yes; I therefore propose to divide the whole into three distinct establishments, as a matter of calculation. If the communication is extended throughout the East, of course that would not be necessary, the boats would then alternately succeed each other in the different ports; if divided into three portions, the number of vessels to be employed will be precisely the same, therefore the expense which will be incurred by each of the three portions will be nearly the same, with some little addition from the expense of coal in the Red Sea between Suez and Bombay. To carry out this communication, as I before stated, it is proposed to have five vessels between England and Alexandria.

1111–12. Of what tonnage?—That is a question depending upon the quantity of traffic. I think 600 tons register would be sufficient; they will carry everything that is necessary for the longest distances they have to run.

1113. Do you mean from England to Alexandria?—Throughout the whole line; I have made my estimate upon that. I propose to employ five such vessels from Suez to Bombay, and five from Socotra to Calcutta, with a spare vessel in India, making an extra vessel on the eastern side, to be used as occasion might require, without its being regularly employed, but available in case of emergency. There will, therefore, be five vessels on the western side of Egypt, and 11 vessels on the eastern side. This plan would give each vessel on each side from 70 to 80 days' steaming a year, which is looked upon as a very good proportion of time, and enables everything to be economically done in the way of repairs at the depôts, also the engines to be cleansed, and so on. It could be done with a less number. The actual work could be done with four for each portion of the distance; four from England to Alexandria, four from Suez to Bombay, and four from Socotra to Calcutta.

1114. Mr. *Mullins.*] You thought between 600 and 700 tons was sufficient for these vessels?—Yes, with 180-horse power; and they might carry from 700 to 800 tons.

1115. Is it your opinion that 180-horse power will be sufficient for a vessel of such tonnage?—It would be sufficient; a larger vessel would be more expensive. Economy being an object here, I think 600 tons is all that is necessary; the vessel would carry 60 passengers, and fuel for 12 or 14 days, which is the outside

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of what would be required, and would give stowage for parcels to the amount of 40 or 50 tons, which would be enough in this communication.

1116. And looking to economy, do you really believe that would be the best sized vessel?—Yes, looking to economy; looking to convenience, a larger sized vessel would be better; but as this has always been put upon the question of economy, it would be dangerous to incur a great expense in beginning this arrangement.

1117. Do you not think if larger vessels were to be built in the first instance, the returns from larger cargoes would meet the additional expense?—The returns from larger vessels might be greater, but that is a mere matter of speculation in the first instance. We average so many passengers, taking a 600-tons vessel, and we do not average a greater number of passengers if we take a 1,000-tons vessel. The return of passengers is an imaginary thing, and therefore would make no difference in the present estimates.

1118. If hereafter it were found that these vessels were too small for the purpose, on account of the increased rate, should you not then say there would be a great loss from the necessity of dispensing with those vessels and obtaining larger ones?—No; I should say employment will be found for those vessels. There will be a communication established out of this between Socotra and the Mauritius, touching at Seychelles, which islands are capable of improvement in various ways, and there would be a communication from Ceylon to Sincapore, which would go to China, and if the Dutch government give encouragement to go to Batavia, and on to the northern point of Australia, where at this moment an idea exists that a settlement might be advantageously established for trade with native vessels in the China seas, for the exchange of trepang, which is a great article of trade there, and which is carried to China in great quantities. Were there an English settlement at Raffles Bay, it is believed the trade might be a good deal advanced.

1119. Then you are of opinion that those small vessels would be in demand sufficient to prevent any loss?—Yes; as in England, when larger vessels take the place of small ones, the small ones have been placed on other stations, and there has always been a demand equal to the supply that could be obtained. I may also mention that there is at this moment spirited exertions making to establish steam communication upon the Indus, which would take some vessels in that direction. The countries on the borders of the Indus are now supplied, to a great extent, by goods from Russia, by way of the Caspian Sea; and Captain Burnes states, that to get through those countries, he was obliged to employ persons connected with Russian trade to enable him to do so. British produce being put by these means on the banks of the Indus at a cheap rate, would drive a great deal of Russian influence and trade from those parts. British goods are brought from Russia and sold cheaper than they are now carried by the present mode of communication from Bombay. The commerce upon the Indus has already began, and treaties have already been made with the native princes to carry the communication as high as Hyderabad.

1120. Sir *John Hobhouse.*] Are you aware that the Imaum of Synd has expressed an intention to contract for two steam-boats to navigate the Indus?—I have heard so. It is also understood that trade will extend very much upon other rivers as well as on the Indus. It has been confirmed by Captain Burnes that the trade may be carried up to Attock, 1,200 miles from the sea, and from Attock it might branch off to the west. I have seen some communication lately from India, speaking in a favourable manner of the prospects and probable success of the trade by the Indus, and that it is already going on and likely to be extended.

1121. Mr. *Mullins.*] Have you understood that a company is actually formed for the purpose of establishing the communication between Point de Galle and Melville Island?—I have not heard of that company. A merchant in London mentioned to me that they had sent to him respecting steam vessels to form a communication between the Isle of France and Ceylon.

1122. That is not the same company?—No, it is a different company; but it shows how greatly steam navigation is extending. It is peculiarly adapted for those seas, because, when you have trade winds in or narrow seas, you are detained months, when a few days would carry you through the passage by steam.

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1123. *Chairman.*] You are chairman of an association for establishing steam communication with India?—I am.

1124. I presume you have received a great many communications from different persons interested in that project?—I have received a great many communications, and I shall be happy to give the contents of them to the Committee; they are contained in these papers, which I beg to hand in.

[*The same were delivered in.*]

There might have been later communications from India, which would no doubt have been more satisfactory, as those in my possession only treat of this project in its infancy. The circumstance of our letters of September not having reached Bombay at the time of departure of the last steamer in January, and those letters having been about 140 or 150 days *en route*, is a strong argument why steam communication should be regularly established. It is expected that the September, October, November, and probably the December mail will have been conveyed to India by the same vessel from the Red Sea.

The association of which I am chairman was formed in consequence of the great delay that took place in establishing this communication to India. In reference to it a letter was received from Sir John Hobhouse of the 27th August last, requesting to be furnished, for the information of His Majesty's Government, with a plan and list of the parties prepared to carry out this measure; but that being at a time of year immediately after the prorogation of Parliament, many persons had left town; some were on the Continent. It is proverbially a dull time of the year, also a great depression was at that time beginning to be felt in the money market; but notwithstanding, it will be considered a strong demonstration of the feeling existing that the Committee were able to send in, by the month of November, a plan for a complete steam communication between this country and India, with a list of subscribers for effecting it, which list is now on the table, containing the *bonâ fide* signatures of most of the leading firms connected with India in the city of London. There were also representations made from various commercial towns of England, Ireland and Scotland, expressing a desire for a steam communication to India by the Red Sea. By the accounts from India it will be seen that parties at all the presidencies were prepared to support the proposed arrangement for this communication as soon as a prospectus should arrive from this country to enable them to do so (the outline only having been received). In fact there would be no difficulty in carrying out the measure, provided it met the approbation of His Majesty's Government and the East India Company.

1125. Are you authorized to make to the Committee any specific offer with a view to carry this project into effect?—The last proposal to His Majesty's Government not yet being, as I am aware, disposed of, I have not another with me, nor any further plan; but if such was required by His Majesty's Government, there would be no difficulty in arranging it.

1126. Sir *John Hobhouse.*] At present you are not authorized to make any offer, the terms of which you think this Committee, acting on behalf of the House of Commons, should be acquainted with?—Nothing more than what has been already proposed.

1127. Mr. *Mullins.*] I think you stated you had been at Camaran?—Yes.

1128. Are you competent from your examination of it to form an opinion as to its being well adapted for a depôt?—I think that island is very well adapted for a depôt. It has a safe and good harbour. It stands about 20 miles from the continent, and therefore it is safe against all Arab incursions, which are frequent in those parts. It also stands in a position to command a great deal of trade; because the coffee country of Arabia is immediately opposite. It is opposite Loheia, which might have more trade than any other place in the Red Sea. I find the quantity of coffee which comes from Arabia is not less than 12,000 tons in the course of a year.

1129. You are not aware that there is any difficulty in steamers getting into the harbour of Camaran?—None whatever. I went into the harbour in a sloop of war, which I should think would draw as much water as any steamer; and I can also mention that numbers of ships have been there at different times. It is a place which was commonly resorted to as an anchorage in former times.

1130. You never heard there was a bar across the entrance?—Not to prevent ships getting in.

1131. Is there any other advantage Camaran possesses independent of those

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you have mentioned?—It has another advantage in point of trade. It is situate opposite to Massouer, which is the port of Abyssinia for trade. When I was at Camaran, I found boats that had come from Arabia and Africa, also from Mocha. There appeared to be a bustling, nice business going on.

1132. From Abyssinia?—Yes; from Abyssinia and Arabia there is a great interchange of commodities. There are about 100 families at Camaran. There is also a fort, which is a protection to the harbour, and when in the harbour it is as smooth as a mill-pond.

1133. Is it your opinion an advantageous trade and a lucrative one might be established by adopting Camaran as a depôt?—I consider a lucrative trade might be drawn there by an European market being established. We now get our manufactures there at a very expensive rate. Any communication of this kind would produce a great deal of trade to repay us for it.

1134. Looking at the past, have you any data to show the trade is likely to be increased?—The people are extremely anxious to possess themselves of various manufactures which they want, all along the shores of the Red Sea; and we found that they brought their commodities to exchange, but we had very little to give them. In one instance I may mention that some dragon's blood was exchanged with the surgeon, who gave what was thought a fair return for it; afterwards he found, by the London prices, he got, I think, to the value of 10*l.* for 5 *s.*

1135. In your former evidence, before the Committee in 1834, you stated, Mr. Salt observes that in Massouer the duties were in Mr. Salt's time (in 1809) 20,000 or 30,000 dollars annually, which, at 10 per cent., made the value of the imports 250,000 dollars annually; are you aware that amount would be likely to be considerably increased in accordance with his opinion?—The opinion of Mr. Salt is confirmed in a satisfactory way by Captain Moresby, who recently made the survey of the Red Sea just alluded to. Captain Moresby thinks there would be no difficulty in establishing agents there, and Captain Moresby mentions that coffee, cotton and indigo are the spontaneous produce of the country.

1136. Do you think a like result would ensue from the establishm[illegible] of a depôt at Socotra?—I have no doubt that it would bring a great deal of trade to Socotra, for there is no direct European intercourse at present on the eastern coast of Africa. Looking back to Portuguese histories of those countries, which describe them, as they discovered them they were rich countries, producing gold dust and valuable commodities.

1137. Can you give the Committee any opinion as to the likelihood of increasing the commerce of Egypt?—No doubt there would be a great increase of the commerce of Egypt. The position of Egypt has only to be looked at to show the great increase of commerce it is capable of. In the intercepted letters of Monsieur Paussielgue, the comptroller of the French army during its occupation of Egypt in 1799, it was stated, by seizing Egypt France would annihilate by degrees the East India trade, enter into it with advantage, and get into her hands the whole commerce of Asia and Africa. In another portion of the same correspondence, it was mentioned, that with the possession of Egypt, in a few years, the plague and other evils which afflict and desolate it, would be removed by the French, and give to agriculture and commerce an activity which would restore that country to its ancient splendour and make it the centre of universal commerce.

1138. Have you considered whether it would be better to make a passage from Cairo to Cosseir, or from Cairo to Suez?—For persons who are going for dispatch, Suez would be the station; for persons who are going for pleasure, Cosseir, most generally, would be the station, by the route of Kennah, on the Nile. If that communication were established, there would be some iron steamers upon the Nile, which is also well adapted for that purpose, like the steamers now working on the Ganges, and there would be easy intercourse by that means to the ruins of Thebes, in Upper Egypt, which are so attractive that few persons would pass without going to visit them.

1139. Do you think for the convenience of packages and parcels the communication by Cosseir, or by Suez, would be the preferable one?—Decidedly the mail by Suez; but I think the greater portion of the passengers would go up the Nile. It is a very pleasant detour. By that means also you would avoid occasionally a troublesome part of the voyage.

1140. Then you think that part of the sea called the Sea of Suez is more difficult for steam than the southern part of the Red Sea?—For two or

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three months in the year, when the wind blows strong in the Sea of Suez. It might not be found desirable for steamers to go beyond Cosseir in that season, because there is no absolute occasion for it; the distance from Cosseir to Cairo, by route, being sufficiently quick to overtake the packet in the time allowed to pass to Alexandria. There is little difference in point of time between proceeding by Suez and Cosseir to Alexandria; that is, you cross from Cosseir in the time requisite to carry on the communication, as six days is the time given to cross from Suez to Alexandria.

1141. Is the communication equally practicable and equally safe between Cairo and Cosseir?—I was at Cosseir and at Suez. I landed at Cosseir, and went by Thebes and Kennah, down the Nile to Cairo, and again across to Suez, to look at the country. When at Cosseir a despatch was sent to Cairo without any difficulty; it was sent as a matter of course; and I found afterwards that it reached Cairo in seven days. There was no particular arrangement made; it was merely sent by an ordinary Arab conveyance.

1142. Are you aware that there is a better supply of water from Kennah to Cosseir than between Cairo and Suez?—The supply of water found in the Desert of Cosseir is sufficient for travellers. The wells may be easily deepened. They are now very much neglected. There has been a boring made in the Desert of Suez, and water has been found.

1143. At what depth has it been found?—At no great depth. In the first instance they gave up when they came to the rock, but afterwards they went through the rock, and soon found water. I do not think the whole depth was above 24 feet. They came to clay, and they found in the clay sufficient water. It was an experiment made by Englishmen, employed by Mr. Briggs of Alexandria.

1144. You refer particularly to the Desert of Suez?—Yes. In the Desert of Cosseir there are several wells. I have already stated they are in an indifferent state, but capable of improvement. There is no one to superintend or protect them, and they are injured with stones or anything else.

1145. Have you any reason to know whether the Pacha of Egypt would charge reasonable duties for the passage of goods between Suez and Cairo?—My opinion is, that this country can always influence the Pacha of Egypt, because the revenue of Egypt is raised principally, or to a large extent, by supplying Arabia with grain and other produce, butter, oil, &c.; and steam communication will command that trade completely, therefore the Pacha's revenue being in question, would lead him to submit to any reasonable terms which the British Government might require.

1146. Then your opinion is, that it would be to the interest of the Pacha of Egypt, or any of his successors, to sustain and encourage this communication?—The Pacha of Egypt has expressed his desire for the communication. I had an interview with him. He spoke about the route to India, and expressed himself much interested in it. He has done so to other persons. He is ready to enter into any fair arrangement which might be offered. As to the present conveyance that is carried on, which is the conveyance of passengers, he makes no difficulty about it, and does not interfere, except to see that they are treated with civility and kindness by his authorities. You make your bargain with the natives for the number of camels you require, which you obtain at a very reasonable rate, so much so, that you can carry a ton of goods across the Desert for 20 *s.*

1147. Do you think it would be for the interest of the Pacha and his successors, independently of any friendly feeling, to encourage the British communication through Egypt with India?—The Pacha feels it is his interest, and is anxious to forward it. He is disposed in every way to favour it, and contribute towards it, and has offered to establish a railroad by way of facilitating it.

1148. Do you think, from the information you have upon those subjects, that from the effect which the British communication with India through Egypt would have, his successors would be guided by similar principles?—Most decidedly; it is the interest of Egypt to have that communication; so much so, that there can be no reason for supposing they will not at all times give every facility to having it continued, and for improving and enlarging it as much as possible. Egypt is a very impoverished country, and the money which would be spent by passengers passing through it would be of immense benefit to the people.

1149. Have you considered what sized iron boats it would be advisable to have

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have upon the Nile for the purpose of carrying on the communication?—They ought to be boats drawing no more than four or five feet water; boats very much like those sent out to the Ganges, drawing perhaps two feet and a half. I went down the Nile at about the lowest time of the river in December, and I found there would be no difficulty in boats of the description I have mentioned navigating it. In the same way steam-boats would navigate from Alexandria round by Rosetta to Cairo, so that you would have no difficulty at all in making the communication.

1150. What is the tonnage of those boats?—They are about 60-horse power and 200 tons, and they have a boat in tow of equal size. There are two of them, and one is the tug-boat.

1151. Have you ever understood there was a description of coal in Syria which is likely to be available for purposes of steam navigation?—Yes, coal has been found there, and it has been supposed it would answer the purpose perfectly. It is not yet worked out; it is in progress of experiment; but it has always been looked to as being likely to be brought forward, and to benefit steam navigation in those parts.

1152. You are not aware whether it would be a matter of importance to work those mines, looking to the cheapness with which coal may be delivered at Alexandria from this country?—Vessels go out in ballast so much from Liverpool that they take out coals in freight; and I mentioned to the Committee of 1834 an estimate given to me by a merchant in London, who offered to deliver coal at Alexandria to any extent at a very moderate sum.

1153. Have you formed any calculation as to the rate at which coal might be obtained at present, in the event of a regular communication being established?—I have formed a calculation throughout the line: I estimate the cost of coal between London and Alexandria at 30*s*. a ton.

1154. Do you suppose that description of coal the Liverpool vessels take out in ballast is that which would be used with the greatest economy?—That would be the coal which would be used generally, and it would be carried across to the Red Sea to Suez.

1155. Do you think it would be the best mode of conveying the necessary supply to Suez?—It would be decidedly more economical than any other mode of supplying it, particularly as the mode has been to bring it from India to the Red Sea at an enormous expense. The East India Company have put their coals down at 6*l*. or 7*l*. a ton. I have a note here from a coal-merchant, who says he should be glad to supply steamers with any quantity of coal, suitable for that purpose, at 1*l*. 14*s*. per ton (that was in 1834) at Alexandria; and another gentleman gives an estimate of his being able to supply coals at 40*s*. per ton at Bombay; upon those estimates the calculations are made throughout. During the south-west monsoon vessels going to Bombay go very near the Island of Socotra, they approach within 200 or 300 miles of it, and the wind would enable them to bear up to the Island of Socotra to deposit some coal there, and then proceed upon their voyage; so that it is probable the extra expense would in a short time be no more than 10*s*. per ton above the Bombay price. I have, therefore, estimated the price of coal at Socotra at 50*s*. per ton. I have supposed that at favourable seasons of the year coal might be carried from the Island of Socotra up to the Island of Camaran, and would be delivered there, no doubt, at 60*s*.; and by the same route there would be no difficulty in getting them to Suez at a future time probably at that price.

1156. Is it your opinion, that under no circumstances would the price of coal at Camaran or at Suez exceed 60*s*.?—That, I think, would be the outside. I think when the passage is known, and the navigation is better understood, the price will fall; and this is confirmed by the opinion of Captain Wilson, who commanded the Hugh Lindsay up the Red Sea. He mentioned in his report, that a mercantile gentleman in Bombay stated his opinion that the depôts could be supplied with coals at 25 rupees per ton; but he adds, let us say 30 rupees, to be on the safe side; he says, in all probability they could be supplied for 25 rupees, but he takes 30, to be on the safe side; and that is the estimate he forms.

1157. Should you think it advisable to have any other depôts on the coast of the Red Sea?—No other is requisite.

1158. Not at Mocha?—There might be some coals laid down at Mocha and at Jidda; but few of these steamers would have communication with those places. They might, however, take in coals, if by chance they wanted any, and so they might at the Maldives, between Socotra and Galle, of which they have sent a plan from Calcutta, and where there is safe anchorage.

1159. At which of the Maldives?—It is the Island of Heavandoo, which is one of the head of the Maldives surveyed by Captain Moresby.

1160. Is that one of the southern islands?—No. It is the northern Atoll of the Maldive Islands.

1161. Do you think it would be advisable to have a depôt at Heavandoo?—There might be a deposit of coal there to afford a supply in case it is required.

1162. What is your opinion as to the price of coal a voyage between Bombay and Suez, Mr. Peacock having stated it to be 5,000*l.*?—I should wish to say that that calculation is formed upon the original estimate which was mentioned by Mr. Peacock before the Committee of the House of Commons in 1832. It was calculated in this way: the coals were purchased in London and freighted to Bombay, costing in the first place about 31*s.* per ton in London, freighted out at 40*s.*, and as much more to the Red Sea; by being freighted from Bombay, raised them to about 5*l.* or 6*l.* per ton; and then other expenses were thrown in, making 7*l.* per ton. Mr. Peacock stated before the Committee in 1834, that coal was sent direct from Lenellah by a ship freighted for the purpose, and those the best coals for steamers, handpicked on board, cost only 34*s.* a ton at Bombay, which quite removes the question as to enormous expense, as in the first instance.

1163. Then your opinion is that the evidence of Mr. Peacock has given is not founded upon data which the Committee would be justified in assuming as correct?—Not correct data at the present day. Those coals were sent probably before the thing was understood, and they were sent in the way mentioned; and that is the estimate of 5,000*l.* which was calculated as the cost of the Hugh Lindsay in each trip, still taken into consideration in Mr. Peacock's evidence at the present day. I also wish to mention that the expense of the Hugh Lindsay has no affinity, and is no rule as to the steamers which would be now employed, as to comparative expense. She was a vessel built only to carry five days' supply of fuel; she is in this voyage laden for 12 days. She was built for a man-of-war, has a speed of four or five miles an hour at first, and she attains only a speed of eight miles; she is therefore going at double the expense which a steamer properly suited for the purpose would do.

1164. Do you think, looking to the accommodation of the passengers, and their safety and comfort, it would be advisable that the captain should have any control over the provisions, and of providing them during their passage?—I think if they were provided upon the plan of the free-traders, which now go backwards and forwards to India, there could not be a better arrangement. They give very general satisfaction to their passengers.

1165. Will you state in what way they are provided?—I am unable to state accurately; I believe there is an arrangement made between the captain and the owner of the vessel. A certain allowance is given for the passengers, and he takes the rest under his control. It would be a proper arrangement to be made with a private company; but in a Government establishment it is difficult to say how it could be best done. The present system does not give general satisfaction, and it is difficult to know how it could be improved in a Government establishment. In that respect I could not offer any suggestion. I do not know the particular arrangement that is made.

1166. Do you think the combined plan preferable to the single one to Bombay?—Certainly. One reason for recommending attention to the combined plan is to insure the plan to Bombay being in the first place efficient, and being kept up, because the general benefits being so much more extended by the combined plan, even if the net expense by that means is not reduced, there would be a greater recommendation for its continuance; also as great moral benefits are expected to arise from its being connected with internal navigation of India by the Ganges and the Jumna; and as steam navigation altogether has been considered so much as a matter of expense, there would be great danger to the cause from insufficient returns causing it to miscarry. For that reason I think it would be necessary for the communication to commence upon a plan to be carried out to the full extent, even if it is not so immediately.

1167. Sir *J. Hobhouse.*] You have heard that objections have been made to Mocha as a fit depôt for coal; do you know any place in the neighbourhood where a depôt could with great advantage be formed for that purpose?—Immediately out of the Red Sea, at the harbour of Aden, which is not more than 150

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miles by sea from Mocha, and a shorter distance across the country, there is an admirable bay where steamers can lie at all times near the shore, and where there is water in abundance.

1168. It is well adapted for the shipment of coals, in fact?—Yes. By having coal there instead of at Mocha, probably 10*s.* per ton would be saved in the price of coal. One of the great expenses in freighting vessels from England is getting in and out of the Red Sea, in consequence of the fixed winds. The passage is very narrow, and vessels are frequently forced to put back after making the attempt to get through the Straits of Babelmandel. At the outer anchorage at Mocha the winds are frequently so strong as to make it difficult to communicate at all with the shore. Under these circumstances it would be very unsafe to supply coals for a packet establishment, from the risk of detention likely to occur.

1169. Mr. *Mullins.*] Is Cosseir a safe harbour?—Cosseir is sufficiently safe.

1170. Will you state whether you have formed any opinion as to the political considerations why the occupation of the Red Sea, in conjunction with steam navigation appears desirable?—I have. In this case our fleet having naval possession of the Mediterranean would at all times secure to Great Britain a certain intercourse with her Eastern empire. The eastern part of this route from Egypt to India would be secure and free from interruption, by our occupation of the Cape of Good Hope, and the consequent impossibility of any western nation sending and maintaining steam vessels in the Indian Ocean, where the prevailing weather and frequent calms would render any other description of force, in case of hostile collision, of little avail. The revenue of Egypt is principally derived from export trade and commerce with nations bordering the Red Sea, liable to interruption by steamers there, and the export trade of Alexandria could in the same way be controlled by the fleet in the Mediterranean; the co-operation and good faith of Egypt would therefore at all times be secured.

There are places towards the lower part of the Red Sea where commercial establishments would bring on influential and extensive intercourse, and give rise to habits of industry and civilization among a fine class of people, who, if required to render assistance, as mariners or otherwise, are well suited for tropical service, and would be useful allies in commercial or warlike operations. The remark applies particularly to the natives on the east coast of Africa and Zanguebar, where the Americans have recently negotiated to be permitted to form establishments for trade. The occupation of the coast alluded to, including Zanguebar and the Island of Socotra, by a maritime nation, would almost insure a command of the trade between Europe and the East, by the Red Sea, and perhaps by the Cape of Good Hope. It will be seen by Horseburgh's instructions for navigation to India, that during several months of the year vessels frequent the passage between the Island of Mozambique and the coast of Africa, and consequently are obliged to pass within a short distance of the Island of Socotra.

On our western frontier of India the Indus river is navigable for 1,200 miles, from the sea to Attock, at the foot of inaccessible mountains. A great benefit must follow the introduction of commerce and navigation on that and the other rivers of the Panjaub. This can only be done by making the science of steam navigation familiar to our subjects on the western side of India. At present there is but one steamer (the "Hugh Lindsay") belonging to the Bombay establishment. A native has already been induced to procure a steam vessel for the purpose of trade and intercourse between Bombay and Surat. Commerce is beginning on the Indus, and the first expedition sailed for Lodiana in 1834. It is remarked in the Bombay papers that give information on this subject, there is no want of enterprise among the natives to take advantage of this new channel for trade and speculation. If this commercial spirit is encouraged by steam navigation being introduced on the rivers of the Panjaub, many important points will be gained to this country. Commercial transactions will be extended, to the benefit of our manufactures, whilst political relations will be strengthened in that quarter, which is the vulnerable portion of our Eastern empire. From the neglected state of trade and manufactures with the natives in the vicinity of the upper portion of the Indus, commercial intercourse is now maintained between Russia and those countries by the route from the Caspian Sea. This trade of Russia is connected with abstract and political views, and tends to promote and keep alive disaffection in the Eastern world, at all times prejudicial to the interest of this country, and creates suspicion which may at any time lead to collision.

The same reasoning that might be strongly urged to advance the enlargement

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of commercial connexion on the Indus is also applicable to the occupation of the Persian Gulf, and the rivers which flow in that direction. A doubt, however, presents itself in respect to the policy of improving navigation on the higher portion of the latter, from the circumstance of their having their source not far from the Russian territory. English merchandize introduced from the sea as high as Anna on the Euphrates, and to Bagdad and Mosul on the Tigris, both of which rivers are thus far accessible for steam navigation, would have great effect in checking intercourse and influence advancing from the north under the cloak of commercial connexion.

The expensive mode at present followed by England of supplying a principal portion of Arabia and Persia second-hand, *via* India, with articles of European manufacture, will in a great measure account for the political depression of British influence in those countries, as well as with the nations that border the Red Sea and the Indus.

1171. Have you any further remarks to make as to the commercial benefits and advantages of a general steam communication to the different presidencies?

In early ages the Red Sea was generally navigated for purposes of commerce between Europe and Asia; with the plans now projected for facilitating the transit of goods across the Isthmus of Suez by a railroad, and through the adjoining seas by steam apparatus, a question arises, how far the Red Sea will resume its ancient character? Without at present going fully into this important investigation, I will remark on such points as present themselves to the minds of all who traverse by this route.

The nations on both sides of the Arabian Gulf, and also on the eastern side of Africa, show every wish to exchange the produce of those countries for articles of European manufacture, such as gunpowder, fire-arms, light clothing, cutlery, ornaments, &c. As to the probable extent of such transactions there is no data on which to form any opinion. The mode by which those countries are at present furnished is most discouraging to the industry of the people. They have no direct intercourse with Europe, but receive manufactured articles, *via* Egypt or India, at double or treble the price if a direct intercourse was established. These remarks particularly apply to Arabia, Abyssinia, and the east coast of central Africa, Socotra, &c., which countries come in direct contact with the route in question. They have been almost totally lost sight of by Europe for centuries, and excluded from British enterprise in consequence of Mahommedan fanaticism to the north of Africa, and the East India Company's trade monopoly to the south. In examining the question, the introduction of English manufacture in the following instance is worthy of remark. Previous to the opening of the Indian free trade it was contended that no great increase of trade in that country could be expected; and in a letter from the Chairman of the India House to the Right honourable Robert Dundas, in 1809, in reference to this question, he says the article of the first necessity (cotton) their own country furnishes more abundantly and more cheaply than it is possible for Europe to supply them. The effect of open trade in this article, has been as follows:

In the year 1814, the year the trade was opened, the export of manufactured cotton to India was	817,000	yards.
In 1815 it was	1,355,476	—
1819	7,127,661	—
1824	23,685,426	—
1827	45,016,850	—
1832	51,833,913	—

The value of cotton exported in the above time increased from 201,182*l.* to 3,238,248*l.*; and the value of all exports from Great Britain in the same period increased from 1,874,690*l.* to 4,674,673*l.* Finding this beneficial result produced by free trade when so little was expected, its probable result in adjoining countries to India appears to be worthy of inquiry, more particularly as other maritime and commercial nations are contemplating their occupation for commerce.

The exports of Arabia consist of coffee, gums, myrrh, senna, dates, balm of Gilead, aloes, and a great variety of valuable drugs. The annual exports of coffee from ports in the Red Sea is stated by Mr. M'Culloch, (who furnished the above report as to cotton,) to be 12,000 tons. The price of it in the London markets, taken at 100*s.* per cwt., and supposing it was valued at the place of shipment at only 50*s.* per cwt., there would be 600,000*l.* available for

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trade by this article alone. From Abyssinia and the coast of Zanzabar are exported ivory, gums, frankincense, hides, and various drugs, also gold dust, &c., which are now exchanged for broad cloth, light clothing and cutlery, but the present state of that neglected country will admit of no opinion being formed of its capabilities. Mr. Salt, who visited Abyssinia in 1809, says, that there is no part of the world where British influence might be exerted with more beneficial effect. The Ras, or King, expressed his gratitude to the King of Great Britain for regarding the welfare of his country, and expressed his anxious wish for intercourse between the two nations.

Some idea of the resources of those countries will be formed by looking into their state when the passage by the Cape of Good Hope was discovered, and they were first visited by the Portuguese about three centuries ago, and at that time they had declined in importance, by the barrier which the followers of Islaim had raised to cut them off from European trade.

Vasquez de Gama and other Portuguese navigators report that a great trade was carried on between the south-west coast of Africa and India, and with the Red Sea; that the produce of the country (Sofala), which they considered ancient (Ophis), was gold, ivory, pitch and wax. They described several cities as places of great trade, and consisting of houses well-built, and streets conveniently disposed. From Melinda to Quiloa, near 400 leagues of coast, they remark on as very populous and full of towns; they also mention many islands bordering it that paid tribute. Quiloa is called an ancient and noble city, a place of great trade for Sofala gold, for which there was great resort of merchants from Arabia. The Portuguese plundered this city, and attacked, plundered and burnt many others which refused or neglected to pay sufficient tribute. They describe their frequent seizure of vessels, and of gold and silver, and altogether they began a reign of terror and rapine which could have no other effect than to put an entire end to intercourse along the coast or by water. Having ravaged the places within reach, they went up the rivers, one of which, the Cuama, runs 250 leagues in the country of Sofala, and reported by them as famous for its gold sands. The back country mountainous, delightful and well-peopled, and watered by many rivers. In 1513 Albuguerga arrived before the city of Aden, outside the Red Sea; it is described to be rich and famous for the resort of merchants of many nations, and situated at the extremity of Arabia, called Zemen, which was full of populous cities, fruitful, and of great trade.

His expedition entered the Red Sea, being the first Portuguese that had done so. He took four ships at the island of Camaran, where he wintered; and on his return went to Zeyla, a city at the mouth of the Red Sea, on the African shore; and this he described as a great market, which, being unprovided, was easily taken and burnt. In 1548 they sent an expedition to Suakin, a port of Abyssinia, and one of the richest cities in the East; it was said to equal, if not to exceed, the most eminent places in goodness and security of port, facility in loading and unloading ships, and traffic with remote countries. No city that the author knew could be compared to it in commerce but Lisbon; it traded with both peninsulas of the Indies to Jidda and Egypt, besides its trade with Ethiopia and the land of the Abyssinians, from whence it had vast quantities of gold and ivory. The above is enough to show that, on the borders of the route in question, opportunities offer for commercial enterprise which it would not be our policy to permit to pass into other hands.

1172. Have you prepared any calculations as to the expense of the different communications; first, between England and Bombay; and, secondly, from England to include all India?—I have; and the following is the result of my inquiries upon the subject:

No. 1.

ESTIMATE of Receipts for Steam Communication with *Ceylon, Madras* and *Calcutta,* in Excess of the same to *Bombay* only.

Passage, Suez to Madras - - - - - - - -	£. 60
Ditto - - Calcutta - - - - - - - -	70
Ditto - - Ceylon - - - - - - - -	50

Average for messing for each passenger, 10*s.* a day for 38 days.

Net profit, say 47*l.* 10*s.* each passenger.

Passengers

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Passengers annually between	Calcutta and Egypt	320
Ditto - - ditto	Madras and Egypt	402
Ditto - - ditto	Ceylon and Egypt	40
		600

	£.
Total 600, at 47*l.* 10*s.*	28,500
Passengers between intermediate parts	3,000
Deck and steerage passengers	5,000
Newspapers, periodicals, invoices, law papers, parcels, samples, jewellery, bullion, &c.	15,000
20,000 extra letters between England and India, at 3*s.* 6*d.*	3,500
Intermediate postages	600
	55,600
Bullion, samples, periodicals, &c. between intermediate places	—
Profit, 30*l.* each on the above 600 passengers between England and Egypt	18,000
	£. 73,600

		Arrivals.	Departures.
Annual number of passengers that pass at present between Europe and	Calcutta	767	665
	Madras	537	459
	Ceylon	85	17
		1,125	1,141
		1,141	
		2,566	

246,011 letters are received and dispatched annually at Calcutta, Madras and Ceylon.

No. 2.

ESTIMATE of Receipts by Steam Communication with *Bombay* alone.

Passage, Suez to Bombay	£. 50
Deduct messing 20 days, at 10*s.*	10
Net profit each passenger	£. 40

If steam communication is with Bombay only, there will be a greater number of passengers than otherwise from thence. The annual number of passengers that at present pass to and from Bombay are, arrivals, 287; departures, 316; total, 603.

	£.
Say 400 passengers at 40*l.* profit	16,000
For deck and steerage passengers	4,000
For newspapers, periodicals, invoices, law papers, parcels, samples, bullion, &c.	10,000
200,000 letters at 2*s.* 6*d.* each	25,000
Receipts to Bombay	55,000
Add 30 *l.* profit on the above number of passengers in the maintenance 400 × 30	12,000
Profits between England and Bombay	£.* 67,000

The number of letters received and dispatched annually to all India, as given in the Madras report to the India Board, are on an average of five years as follows:

	Received.	Dispatched.
Calcutta	98,189	72,397
Madras	31,306	40,614
Bombay	30,000	24,000
Ceylon	6,000	6,505
	165,495	143,516
		165,495
Together		309,011

Estimate

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* The London Association estimate their receipts at 74,500*l.* to Bombay. The rate of postage differed from the above, which is considered as now determined on by His Majesty's Government as postage for letters between England and Bombay.

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No. 3.

ESTIMATE of Expense for Communication between *Suez* and *Bombay*.

Outlay for one Steamer:

		£.
Hull, &c.	*14,000*	*25,000*
Machinery	*11,000*	

Annual Expenditure.

			£.
Sinking fund to perpetuate property, repairs and insurance, 16 per cent.			4,000
Interest four per cent.			1,000
Establishment and victualling			2,642
Coals at Suez	60 *s.*	average 52 *s.* 6 *d.* per ton.	7,642
— Camaran	60 *s.*		
— Socotra	50 *s.*		
— Bombay	40 *s.*		
Say 14,000 miles steaming for each vessel in a year, at 200 miles a day, with 18 or 19 tons of coal per diem, making 70 days' consumption, at 52*s.* 6*d.* per ton			3,400
			£.11,042

Five vessels would cost 55,000 *l.* a year to maintain the communication between Suez and Bombay.

Floating depôts for coals between Suez and Bombay, establishment in Egypt, &c., not included.

No. 4.

ESTIMATE of Expense between *Falmouth* and *Alexandria.*

Outlay, one Vessel.

		£.
Hull, &c.	14,000	25,000
Machinery, duplicates, &c.	11,000	

Annual Expense:

Sinking fund for repairs, and to perpetuate property and insurance, 16 per cent.	4,000
Interest at four per cent.	1,000
Establishment and victualling	2,642
Say 14,000 miles, or 70 days' work for each vessel, and consuming 18 or 19 tons per day, at 30*s.* a ton throughout	1,900
	£.9,542

Five vessels, at 9,542 *l.* each, causing an annual expenditure of 47,710 *l.* for this portion of the work; establishment, warehouses, &c. not included.

No. 5.

ESTIMATE of Expense between *Socotra* and *Calcutta.*

Outlay for one Steamer, 600 to 700 Tons, 180-horse Engines.

		£.
Hull, &c.	14,000	25,000
Machinery and duplicates	11,000	

Annual Expenditure.

*Sinking fund for perpetuating property, repairs and insurance, 16 per cent.	4,000
Interest on outlay, four per cent.	1,000
Establishment and victualling	2,642
†14,200 miles steaming a year each vessel, at 200 miles a day, would require 71 days' coal, at 18 or 19 tons per diem.	
‡One quarter the supply would be from Socotra, say at 50*s.*; one half from Galle, at 30*s.*; one quarter Calcutta, at 30*s.*; making 1,330 tons, at 35*s.* per ton; say	2,300
	£.9,942

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* The moderate work required by each vessel is to be taken into account.

† I find the distance between Calcutta and Socotra is also estimated at 2,955 miles.

‡ Madras memorial to Court of Directors (March 1836), reports, "From statements of actual transactions, furnished by the mercantile houses here, it appears we are warranted in taking 30*s.* as a fair price for coal in India at present. The general opinion of merchants here is, that it is more likely to fall than to rise, when there is a certain demand.

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Five vessels, 50,000*l.* for the whole duty; and this may be lessened by the vessels remaining in port giving a portion of their crews to others, as they might be fairly employed double the time here named.

COALS required each Year.

	Tons.	Each Voyage between	Tons.
At Suez	1,250	Suez and Camaran	104
Camaran	2,256	Camaran and Socotra	85
Socotra	4,584	Socotra and Bombay	136
Bombay	1,632	Socotra and Galle	160
Galle	3,672	Galle and Calcutta	136
Calcutta	1,740		
TOTAL	15,134	tons a year, of which about 14,000 will go by the Cape of Good Hope.	

SHIPS and TONNAGE to India in One Year (per M'Cullock).

	Ships.	Tons.
To East India Company's territories and Ceylon	193	85,260
To China	19	24,648

No. 6.

ESTIMATE of Returns on the combined Plan.

In this case the Bombay receipts would be less than original estimate for Bombay only.

	£.	£.
Say 250 passengers at 40*l.*, profit	10,000	
Deck and steerage passengers	2,000	
Periodicals, parcels, newspapers, &c.	7,000	
100,000 letters, at 2*s.* 6*d.*	12,500	
The above 250 passengers in the Mediterranean, at a profit of 30*l.* each	7,500	
		39,000
Returns as per estimate No. 1, England with Calcutta, Madras and Ceylon		73,600
100,000 letters transferred from the Bombay estimate No. 2, would now be distributed amongst the above places, average 3*s.* 6*d.* each		17,500
		130,100
Expense, between England and all India (Estimate London Committee)		185,000
Deficiency in Receipts for communication with all India, to be covered by allowance from Her Majesty's Government and the East India Company, for conveyance of public despatches, &c.		£. 54,900

	£.
Estimate of expense between England and Bombay only	136,000
Receipts to Bombay only	67,000
Deficiency in Receipts for communication with Bombay, to be covered as above	£. 69,000

	£.
Deficiency on extended plan	54,000
On Bombay plan	69,000
In favour of extended plan	£. 15,000

Thomas Turton, Esq., called in; and further Examined.

T. Turton, Esq.

1173. Mr. *Mullins.*] MR. PEACOCK stated in his evidence that the charge for freight from Calcutta to Mocha would be 50 rupees per ton; does your experience enable you to state whether that opinion is correct or not?—I know it is not correct. We freighted a vessel, as members of the steam committee, when we sent the Forbes from Calcutta to lay in coals both at Socotra and Jidda; we paid 37 rupees per ton to Jidda and 35 rupees per ton to Socotra. Mr. Peacock also stated the delay at each place would be five days for coal. We made our arrangements through the native agents, and the agent we sent to Socotra was absent at the time the vessel arrived; he had gone on to Jidda; but notwithstanding his absence, they laid in 40 tons of coal in two days, and I believe

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believe it might be done in less. I think the delay at Jidda was the same, but that I cannot speak to with the same certainty as I can of that at Socotra. I have no doubt Mr. Peacock took his estimate from what he had known to be paid by the Company, and he judged from the freight paid from Bombay; but last year the Company paid only, from Bombay to Suez, 32 rupees per ton. The fact is, that at the season of the year when the pilgrims go to the Hadje, there are a number of vessels going to the Red Sea which are very glad to take freight, and they will take it at a lower rate than I have mentioned, I have no doubt, if proper arrangements are made for that purpose.

1174. Do you wish to state anything further?—I believe there is nothing further.

Martis, 4° die Julii, 1837.

MEMBERS PRESENT.

Mr. Bagshaw.	Mr. R. Gordon.
Lord William Bentinck.	Mr. Mullins.
Mr. Crawford.	

LORD WILLIAM BENTINCK, IN THE CHAIR.

Major *Charles Franklin Head*, called in; and further Examined.

Major *C. F. Head*.

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1175. *Chairman*.] IS there any part of your evidence that you wish to explain?—Yes; a part of my evidence that I am anxious to explain is in reference to a question that was asked me on Friday last. I stated on behalf of the London Committee that there was no further proposal to lay before this Committee, this however was said under a supposition that a proposal sent into His Majesty's Government, dated 24th May last, was before this Committee, finding that it has not been given in I now feel it my duty on behalf of the London Committee formed for the promotion of steam navigation with India, to lay the same before the Committee and request it may be placed on record. This is a copy of the plan, and the letter which accompanied it to Sir John Hobhouse.

[*The same were handed in and read, copies of which are as follow:*]

Plan for a comprehensive steam communication with India, and the mode in which it is to be effected:

Packets to depart from England and the three Indian presidencies respectively, once in every month, to be regulated as to the time of their departure, so as to ensure the effectual working of the plan throughout. The packets to be independent of the Government Malta mail-packets, and the voyage to be a continuous one throughout. The packets to be adapted as well to the conveyance of samples, parcels and packages, as to accommodate at least 60 passengers, to be subject to Government inspection whenever deemed necessary. That the company place a requisite number of vessels between England and Alexandria, also between Suez and Socotra, and between Socotra and Bombay, Ceylon, Madras and Calcutta; these vessels to enjoy all the immunities from duties, port charges, &c., similar to His Majesty's packets, whether at home or in the European or Indian Seas. The special protection of Government to be afforded to the company's agents and servants in Egypt. The Government to grant to the company the sum of 125,000 *l.* annually for ten consecutive years, by monthly allowance, subject however to the following condition, viz.

		£.
Sum required - - - - - - - - - -		125,000
Postages are estimated at - - - - -	£. 75,000	
Conveyance of Government and East India Company's despatches - - - - - -	20,000	
		95,000
	£.	30,000

Therefore, 30,000 *l.* will be the positive annual cost to the Government and the East India Company for establishing a communication fraught with such political, commercial and moral advantages to the two countries. If the company shall realize profits exceeding 10 per cent. on their capital paid up, the excess of such profit to be abated from the Government contribution; it being understood that 5 per cent. for interest, and 5 per cent. on the investment for premium of insurance during peace, with a proportionate

increase

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increase for war, and 5 per cent. for the formation of a fund to replace the property, shall be considered as charges on the capital before profit is estimated. The company's packets to convey the Home and Indian Government despatches, and the several Indian mails between England and India, free of any other charge to Government, the postages on both sides remaining altogether with Government. An extra Mediterranean mail to be conveyed for Government free also from charge.

Sir, No. 6, Crosby-square, 27 May 1837.

I HAD the honour, in the month of November last, to forward you, through William Hutt, Esq., M.P., a report of the committee for promoting steam navigation with India, in which it was proposed to establish a monthly steam communication with Bombay *via* the Red Sea, with the view of extending the same at a future period, and certain services were thereby offered to be performed for His Majesty's Government and the East India Company, in consideration of the amount of 65,000 *l.* being paid annually. The provisional committee have not ceased to devote unremitting attention to this important subject; and I have been requested by the committee respectfully to inform you, that further experience and the benefit of their communications with India fully show the necessity of the measure being extended to the various presidencies at once; and with this view they have desired me to submit to you, and to request you will be pleased to lay the same before His Majesty's Government, a renewed proposal for the establishment of steam communication with India on a comprehensive plan, suited to meet the great and important interests of all classes deeply involved in the success of this undertaking.

I have the honour to be, Sir, your most obedient servant,

Charles F. Head, Chairman.

To the Right Hon. Sir John C. Hobhouse,
President of the India Board.

1176. Mr. *Bagshaw.*] You have had the advantage of reading the papers that were placed on record, the proceedings by the President of the Board of Control, and particularly a letter from the secretary to the Post-office to the Postmaster-general; will you state to the Committee in what way you considered that letter and its statements to be incorrect?—The letter to the Earl of Lichfield, the Postmaster-general, had reference to the existing communication *via* the Cape of Good Hope. Upon that communication, on which 2*d.* and 4*d.* is charged for letters, an estimate was made of the present amount arising to Government and to the public from postage between England and India; that, of course, amounted to a very small sum, and therefore it was said, as a reason for declining the offer of the London Association to establish communication with India, that the public would require to make up a very large sum of money, as much as 400 or 500 per cent. upon their present postage between England and India. In the statement alluded to, no credit was given for passengers, for parcels, for specie or for other sources of profit which the London Association had very largely calculated upon, and which would lessen any charge for postage. Also, in reference to the Mediterranean packets, the present postage to India and to the Mediterranean was calculated on the Government account, and that sum, amounting to about 13,000*l.* a year for Indian and Mediterranean postage, was taken as what the Government would benefit in lieu of 45,000*l.* a year asked of them by the association for establishing a communication monthly with India; likewise the expense of the Mediterranean packets, which would be superseded by such an arrangement. The latter would give the Government a saving of probably 30,000*l.* at least per annum, which ought to be taken into account in the statement alluded to.

1177. Is there anything more that you wish to speak to; what is the difference as to the proposal that you have now given in and the proposal of the London committee as already on record?—The proposal of the London committee that was first submitted to His Majesty's Government was in reference to an extended communication with all India, but was estimated upon a limited communication with the port of Bombay, as being the nearest place to arrive at, and consequently admitting of less complicated estimates and arrangements; but it was given in with an understanding that, as soon as the principle of steam communication with India should be obtained, the communication was to be extended by the London Association to all India; and for that purpose, a gentleman in the city, who is a commissioner appointed in India to attend to this subject, did not join the provisional committee in London, with an understanding that as soon as such principle was obtained (of steam communication with India), he was to put himself in communication with the London committee to obtain the extended arrangement. For that purpose also the capital of the London Association was placed at 500,000*l.* to admit of communication

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with all the presidencies of India, instead of 250,000*l.*, which would be quite sufficient to establish a monthly communication with Bombay alone.

1178. What reason have you for supposing the extended plan ought to be the one begun with?—The extended plan can be done at a saving of expense in the first instance, and the benefits obtained by it will be very large in proportion to the net expenditure, over a limited communication to any one port in India. The great expense of communication is from England or between England and the entrance to the Red Sea. The comparative expense of extending it from that point to the different presidencies of India is as one to three in proportion to the first outlay, whereas the benefits are proportionately great.

1179. I presume there is no more difficulty in the one plan than the other?—The plans are equally practicable, and the expense that would be incurred by the greater is less in consideration of the receipts; whereas any miscarriage in a confined plan having limited benefits and dividing the interests concerned in this undertaking, would have much more danger of total failure, and this is the thing only now to be guarded against. Various arguments in favour of the general communication are detailed in papers already put in to the Committee.

Lieutenant-Colonel *Sim*, called in; and Examined.

Lieut.-Col. *Sim.*

1180. *Chairman.*] YOU are a Lieutenant-colonel in the Madras Engineers?—I am.

1181. I believe you were ordered by the Madras government to survey the Straits of Manay, were you not?—Yes, in 1829.

1182. Would you have the goodness to state to the Committee what those orders were?—Those orders were to inspect the passage between the island of Ramisseram and the coast of Coromandel, and to ascertain the practicability of the passage being improved and deepened, so as to admit of vessels passing through it.

1183. Would you state the substance of your report?—That it was practicable to a certain extent.

1184. Be so good as describe the passage of Pambam as you found it, between the island of Ramisseram and the coast of Coromandel?—It was found to be about six feet deep at high water, and from three and a half to four feet at low water, the rise and fall of the tide being from two feet to two feet six inches.

1185. What was the extent of that passage?—The space between the island of Ramisseram and the coast of Coromandel is about a mile and a quarter, and is connected by a ridge of rocks about 140 yards in width, through which there is a narrow channel, as above described, containing six feet of water at high water and three and a half or four feet at low. After minutely surveying and examining the passage, it was considered practicable to obtain a passage of about 12 or 14 feet of water at high water, but that the expense would be considerable. A copy of the map and report was transmitted to the Geographical Society in London, which, if required by the Committee, I think I can obtain for their information.

1186. What was the nature of the rocks?—Sand rock; a rock of sand, very much decayed and of no great depth, and very easily removed; but that is not the chief difficulty; the chief difficulty is a sand bank which lies a little to the south of these rocks, and upon which there is not more than seven feet of water at high water. It is the removal of this sand bank, or deepening the channel across it, which was considered the principal difficulty. One of the proposed plans of obtaining a passage through the straits was by cutting a new channel to the west of the present one, by means of which the sand bank would be entirely avoided.

1187. You state 12 or 14 feet as the depth to which you could deepen the rocks?—Yes, 12 or 14 feet.

1188. How would you do that?—By blasting the rock, and removing it; a partial attempt was made, and succeeded, as far as it was attempted.

1189. Do you think it could be deepened more, if necessary?—I think not above 12 or 14 feet at the utmost.

1190. What do you conceive to be the cause of the formation of the sand bank?—It appears that the island of Ramisseram and the Coromandel Coast were originally connected, and that the sand bank was formed from the debris and materials of the chain of rocks connecting the main land and the island of Ramisseram, when it was broken up and destroyed by some hurricane.

1191. Is

Lieut.-Col. Sim

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1191. Is there any current in the Pambam passage?—There is a very considerable one.

1192. Where is situated the bank called Adam's Bridge?—Between the islands of Ramisseram and Manar; it is about 30 miles in length and a quarter of a mile in breadth, and is partly above and partly below water, with three winding channels across it.

1192*. Do you know whether the state of the sand bank is altered, whether it undergoes any change?—The bank undergoes no change, but the channels across it and the depth of water on each side of the bank alter very much according to the monsoons; the weather side of the bank is always clear and free from sand banks; but on the lee side, and especially opposite to the three channels, there are always a number of shifting sand banks on which there is little water, and which obstruct the passage through the channels; on each side of the bank, at the distance of two and a half or three miles, the sea is six fathoms deep.

1193. Mr. *Mullins.*] The passages themselves are constant, they do not seem to vary?—The three principal passages do not alter their position; they seem always to continue in the same places.

1194. *Chairman.*] What depth of water on the bank did you say there was?—The bank itself is generally about four or five feet above water, but there are many parts of it, at times for two or three miles, which are covered with two or three feet of water.

1195. What is the breadth?—Not above a quarter of a mile, and at the distance of two and a half or three miles from it on both sides the depth of water is six fathoms. It is a singular formation, and is not easily accounted for; the sea is perfectly clear on both sides at the distance of two miles.

1196. And you are quite satisfied it is composed entirely of sand?—It was bored down to the depth of 50 feet, and there was sand to that depth, and not the slightest appearance of rock. The formation of rock which connects Ramisseram and the coast of Coromandel, runs in a different direction, and passes quite clear of the bank called Adam's Bridge.

1197. Has it ever been attempted to make a passage at Adam's Bridge? No; no attempt has ever been made.

1198. What do you think would be the effect of making a passage?—It would be the greatest possible benefit, if practicable.

1199. But do you think it would be practicable to make a passage across?—It might, but at an enormous expense.

1200. Over the sand bank?—Yes; that is the only place where deep water and a clear sea could be obtained sufficient for large vessels. When I was sent down to survey this, there was no question then about steam communication: it was entirely for the purpose of obtaining a passage for sailing vessels, to prevent the delay and difficulty of passing round Ceylon during the monsoons. The only place where a passage of that description could be obtained is across Adam's Bridge, but the expense would be far beyond any benefit that could be derived from it.

1201. Mr. *Mullins.*] And you do not suppose it could ever be a safe passage in consequence of shifting sands on either side?—Except by means of bulwarks carried into deep water to prevent them.

1202. Which would lead to an enormous outlay?—Yes.

1203. *Chairman.*] But if you could deepen the passage, there would be no sand banks?—No, not if you could deepen it, and keep it deep beyond the influence of the surf.

1204. But would there not be a constant current through?—Yes.

1205. You think that would not keep the passage open?—Not unless there were bulwarks carried into deep water beyond the breaking of the surf; there is a heavy surf, especially during the south-west monsoon, which would throw up the sand, and prevent its ever remaining open, unless there were bulwarks carried into deep water, and beyond the influence of the surf.

1206. Mr. *Mullins.*] And you do not apprehend it is possible to cut through the rock to a greater depth than 12 or 14 feet, between the island of Ramisseram and the main land?—The rock itself is not more than two or three feet deep; you then come to a sandy bottom. It is the rock which originally connected the island and main land, the continuation of which can still be traced on the two opposite coasts, and which has been broken up by some hurricane, and is fallen down into the bottom of the channel; on the removal of this you would come to a clear sand bed.

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1207. Then what difficulty do you apprehend there would be in making the channel deeper?—The channel might be made deeper, but there is the bank beneath it; the difficulty is in deepening that. There is no difficulty in deepening the channel itself, and deepening the ground on both sides of it, to a certain extent, but the difficulty consists in deepening the sand bank which lays to the south of it, and which is formed by the debris, or the materials of the land which originally connected Ramisseram and the main land. One plan proposed was to cut a new channel through a tongue of land to the west, so as to keep clear of the sand bank altogether.

1208. What is the breadth of that tongue of land you mention?—About half a mile.

1209. And is it low?—Yes; five or six feet above high water only.

1210. What is your opinion of such a project?—It might be done at a moderate expense.

1211. And is there deep water on either side of that tongue of land?—Yes, a depth of 12 feet.

1212. *Chairman.*] Do you think you could keep that channel open?—To the depth of 12 or 14 feet.

1213. You think you could?—Yes.

1214. Is there any surf sets on this?—Very little surf. It is a hard bottom to the north-east, and to the south-west it is protected by islands.

1215. Do you consider that the best mode of accomplishing a passage?—I think it is the best one, certainly to the depth of 12 feet.

1216. Mr. *Mullins.*] Do you not apprehend it is possible to deepen the passage more than 12 feet?—I do not think it is possible; it would be very impolitic to trust to its being deepened beyond that; it might be possible, but is very doubtful.

1217. *Chairman.*] What is the depth of water on each side of that tongue of land?—On the north side, at the distance of 400 yards, the depth is 14 feet, and the same depth at 250 yards on the south side.

1218. But it never can be made a passage for steamers drawing 15 and 16 feet of water?—No, I think not.

1219. It has been stated there is a passage between the island of Manar and the main land of Ceylon; what is the depth of that?—Not more than three or four feet; that is quite out of the question; quite impracticable.

1220. Where is the sand bank you stated?—It is 700 or 800 yards to the south of the Pambam passage.

1221. Is there the same depth of water upon that always?—Always the same; it never varies.

1222. Where is Tootoocooreen?—Tootoocooreen is in the Gulf of Manar. If Tootoocooreen or Cochin were made the starting and arriving point for the Indian passengers, then a steamer drawing 10 or 12 feet might be employed to carry the passengers to and from Calcutta, and might pass through the Pambam channel when improved.

1223. What sort of harbour is it?—It is a safe roadstead.

1224. That is quite sufficient at all seasons?—Yes, I believe so.

1225. It is very difficult to get in to Cochin, in the south-west monsoon, is it not?—Not with steamers; with sailing vessels it is.

1226. You have surveyed Cochin, have you?—I have not been there.

1227. Have you been at Goa?—No, I have not.

1228. By report, which is the best port of the two?—Goa is the best.

1229. Mr. *Mullins.*] Have you formed any opinion or estimate as to the expense of making the passage between Ramisseram and the main land?—From 10,000 *l.* to 15,000 *l.*

1230. You think that would do it in the most effective way practicable?—Yes, I think so.

1231. Mr. *Crawford.*] At the Gulf of Manar?—Yes.

1232. *Chairman.*] Would not the deepening of that passage be a very great benefit to the native vessels between the two coasts?—Yes, a great benefit.

1233. Has any improvement been made in that passage?—The passage was straightened and slightly deepened, and native vessels now pass through with much more facility, and drawing rather more water than formerly.

1234. How much did you deepen it?—A few inches only.

1235. Mr. *Crawford.*] How was it straightened?—By the removal of the intervening rock.

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1236. Blasting it?—Yes, by blasting it.

1237. *Chairman.*] Have you reason to know what the feelings of the inhabitants of Madras are respecting this communication?—They are very much in favour of it; very anxious to take advantage of it; but they are obstructed greatly by the difficulty and expense of finding their way to Bombay, which restricts the advantage at present to single men; but there are some cases where ladies have also taken advantage of that route.

1238. If the communication was perfectly established, do you think that the greater part of the civil and military officers would take advantage of it?—Almost the whole of them would, both married and single; there is a very great desire indeed for it.

James Cosmo Melvill, Esq., called in; and Examined.

J. C. Melvill, Esq.

1239. Mr. *Gordon.*] ARE you aware of the depth of water in the inner harbour of Mocha?—I have understood there is not sufficient depth of water for steamers of the burthen of the Atalanta and the Berenice when fully laden.

1240. Do you consider that that deficiency of water in the inner harbour of Mocha will in any way interfere with the arrangement which has been made for the steam navigation between Bombay and Suez?—I do not. Sir Charles Malcolm has stated that whatever difficulties there may be with respect to the anchorage at Mocha, he is satisfied that they may be overcome. It has been suggested that there should be a floating depôt in the outer harbour; doubts have been entertained whether that would be practicable; and if it should be found impracticable, he is of opinion that Perim may be substituted for Mocha. It has also been suggested that coal might be transported from Mocha to Aden, and that Aden might be made the station.

1241. Are you of opinion that if letters are put into the English post-office in India, in expectation of a monthly communication being immediately established, that persons relying upon that conveyance will be disappointed?—I am not; there may be some disappointment occasionally, until more steam vessels are supplied, but the Bombay government have been authorized temporarily to supply the deficiency by the use of sailing vessels; and I think in that mode the disappointment may be in a great degree averted.

1242. Are you of opinion that during the prevalence of certain winds (the monsoons) it will be useless to expect a regular monthly communication between Bombay and the Red Sea?—I am not of that opinion; but of course as to the effect of the monsoon in the Indian seas on steam navigation, that is a professional point with which I am not conversant.

1243. Are you of opinion, that under the present arrangements, the probability is, that instead of a monthly communication, it will be a two monthly communication for the next two years to come?—That is not my opinion; I am convinced that the Indian government will use every effort to accomplish the arrangement to the extent contemplated in the Court's order.

1244. Is it your opinion that sufficient power has been given to the Indian government, and sufficient means placed at their disposal, for the purpose of effecting that which your instructions contemplate, namely, a monthly communication between India and Europe?—I think they will not have sufficient means to insure it until a further supply of steam vessels is sent out; but the probability is, that the object will be in a considerable degree attained by the use of sailing vessels to supply the existing deficiency.

1245. What steps have been taken for the purpose of placing any new steamboats there?—Not any at present; that subject is under consideration at the India House.

1246. Is your opinion in favour of passing the public despatches through France to Marseilles, and embark them at Marseilles on board the steam-boats, instead of sending them all the way from England by the Malta packets?—The communication will be greatly accelerated by way of Marseilles.

1247. Is it your opinion that this steam communication will be the means of conveying passengers as well as letters, and that passengers will avail themselves of that opportunity?—No doubt.

1248. Do you apprehend that the bringing of passengers will not only be a convenience to the inhabitants of India, but also a source of profit to the Company?—I think it might be so made.

1249. You think it might be made to combine both elements; both conve-

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nience to the parties and profit to the Company?—I think an arrangement might be made by which a profit would result from the conveyance of passengers.

1250. Mr. *Crawford.*] In the shape of passage-money, for the accommodation of the vessel?—Clearly; the arrangement with respect to the Hugh Lindsay latterly has been to charge a certain sum for the passage-money, of which the captain takes a portion, he paying the cost of the table.

1251. Mr. *Mullins.*] Do you know what proportion that is?—I am not aware of it at present; I could obtain it for the Committee.

1252. Mr. *Gordon.*] Are you aware of the communication that has taken place with the Court of Directors on the subject of the tripartite communication with the Red Sea, I mean to Madras, to Bombay and to Calcutta, in preference to confining the arrangements entirely to Bombay; are you aware of that communication?—I am.

1253. Are you aware of the arguments that have been adduced in favour of and against that scheme?—Sir John Hobhouse, in his letter to the chairman, expressed an opinion that no scheme would be satisfactory that did not embrace the whole of India.

1254. But was that scheme to embrace the whole of India by means of inland communication from Bombay, or was it a steam communication?—A steam communication.

1255. Can you state to the Committee, in substance, the arguments that have been adduced to the East India Company in opposition to that scheme?—The general argument is, that having ascertained by experience that the route from Suez to Bombay was practicable, and not having any such experience for a guide with respect to the other parts of India, it has been thought most desirable to limit the establishment at first to a communication between Suez and Bombay.

1256. Has not the point of expense also weighed considerably with the Court of Directors, in limiting their arrangements, in the first instance, to a single communication, instead of a tripartite communication?—I do not think that the Court of Directors have yet sufficiently entertained the plan of a communication with all India to have made the expense a matter of calculation; they would undoubtedly do so as soon as the proposition assumed a definite shape.

1257. Are you not aware that the discussions which have taken place between the King's Government and the Court of Directors of the East India Company, has, as it were, ended in this arrangement, to effect which considerable difficulty has been encountered?—Certainly.

1258. Are you not also aware, that if the King's Government or the Board of Control had pressed too strongly on the Court of Directors a more extended scheme in the first instance, that there might have been a considerable probability that no arrangement whatever would have taken place?—I think it would have greatly increased the difficulty.

1259. *Chairman.*] What establishment of steamers do you consider to be necessary to carry the communication on to Bombay?—I think four absolutely necessary, and that it will be desirable to have a fifth.

1260. And to Calcutta?—I have not made any calculation for Calcutta, but looking at the distance, (I believe Calcutta is as far from Socotra as Bombay is from Suez,) it would seem to require an establishment as large.

1261. Mr. *Mullins.*] That is, you mean four additional?—Yes, four additional steam vessels; supposing Socotra was made a station from Bombay, and that there was to be a communication from Socotra to Calcutta, I should imagine you would require for that communication as many vessels as you would require for the communication from Suez to Bombay.

1262. As many more?—As many more.

1263. *Chairman.*] In the year 1831 there was a doubt of the practicability of steaming against the south-west monsoon from Bombay?—There was.

1264. Is that doubt removed?—It is in some measure removed; still it is matter of opinion.

1265. Have you any doubt upon the subject?—Really I have not the means of forming an opinion that would be of any use or satisfactory to the Committee.

1266. Mr. *Crawford.*] Are you aware a Malta steamer, two years ago, was forced back to Falmouth after having sailed?—I am.

1267. Mr. *Mullins.*] What was the power of that steamer?—I do not know.

1268. *Chairman.*] Are you acquainted with the estimate of expense of this communication with Bombay, of the four or five vessels?—I am.

1269. Is it the same as Mr. Peacock stated?—The estimate is contained in the statement of Sir John Hobhouse, page 6.

1270. Then the expense would be 22,000 *l.* a year for each?—For each.

1271. That estimate you consider to be correct?—I have every reason to believe it is.

1272. Because from other statements there is reason to believe the coals will not cost so much money as that?—We endeavoured to make it a safe estimate; we require experience to enable us to judge of the expense of coals, and the Court of Directors are now endeavouring to ascertain by experiment what is the cost of placing coals at the several depôts.

1273. Has any allowance been made in this calculation of the cost of fuel that the vessel on its voyage will sail the greater part of the way, having the monsoon perfectly fair?—Your lordship will see it stated in the estimate that each voyage is supposed to occupy 40 days in steaming.

1274. Surely that is very much over-estimated?—The estimate in that respect was formed with reference to the actual voyages of the Hugh Lindsay.

1275. We have gone in all our calculations upon the performance of the Atalanta and the Berenice?—They are much finer vessels.

1276. Much faster?—Much faster.

1277. Have you made any estimate of the length of passage from Bombay to Suez and back in the two monsoons, either the Atalanta or the Berenice?—I have not.

1278. Could you give such a statement; you have got the logs at the India House, I suppose?—I apprehend there will be no difficulty in preparing such a statement.

1279. It was stated here, I think, in the course of the evidence, that Colonel Campbell had written to the India House, making some proposals respecting the use of coals, at a much less price than that; do you know of any such communication?—I have seen a communication from Colonel Campbell, addressed either to the Court of Directors or to the Bombay government, in which he recommended the plan of sending coals to the Red Sea by way of Alexandria; and the Court of Directors have recently come to the determination to make an experiment of that kind.

1280. Have you made any calculation of the probable returns from each voyage between Bombay and Suez?—I have not.

1281. I mean of receipts?—I have not.

1282. What is the number of passengers that the Atalanta and the Berenice carried?—It is stated, in Mr. Peacock's evidence; 36 I believe.

1283. Then you probably have not made any calculation of the number of passengers that would go between Calcutta, Madras and Suez?—I have not.

1284. Without forming any calculation of the number of passengers and freight that would pass between Calcutta, Madras, Ceylon and Suez, you could not state the probable profits that would be derived from that extended communication?—Certainly not.

1285. And without information upon that point, you could not say that the extra expense would not be repaid by those profits?—I could not exactly say so, but it would be a large assumption that the returns would be adequate to the whole expense.

1286. The whole of the extra expense?—The whole of the extra expense of steam from Socotra to Calcutta and Madras.

1287. Mr. *Crawford.*] Hypothetically we will suppose that two steamers more are necessary to carry on the communication with Bengal than would be required to carry on the communication with Bombay, and that they cost each 22,000 *l.* per annum, it will follow that the additional earnings upon the Bengal route must amount to 44,000 *l.* a year in order to make that a preferable route with reference to expense?—Clearly.

1288. Mr. *Mullins.*] Do you think it would be a point of importance that steamers, in a general communication with the different presidencies, should carry a cargo, to a certain extent, as well as passengers?—Certainly, cargo would be remunerative.

1289. Independent of the luggage which the passengers would take with them?—Passengers, I apprehend, would be more profitable than cargo; but if the

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the steamer could convey cargo as well as passengers, it would be desirable that she should do so.

1290. Assuming that a large steamer, of the size of the Atalanta or the Berenice, or even larger, could afford to take 100 or 150 tons of a general cargo, should you suppose that such a cargo would make a large return?—I have made no calculation upon that point, and I am not sufficiently conversant with the rate of freight between India and the Red Sea to enable me to do so.

1291. Mr. *Crawford.*] At present, do you know of any articles conveyed to India from Suez?—I do not.

1292. Mocha is the port of export for the produce of Arabia gums and coffee, is it not?—It is.

1293. Then, if a steamer were to carry the goods that are the present objects of trade from the Arabian Gulf, she must either call at that port, or the goods must be brought to the port of her departure?—I should think so.

1294. Then, with reference to the question of the conveyance of goods, it must be considered applicable to a description of trade that does not at present exist?—Clearly, as respects Suez.

1295. But respecting which this facility might occasion to grow up?—Yes.

1296. *Chairman.*] Do you mean to say there is no trade between the Red Sea and India?—I never meant to say so; I understood the question to apply to a communication between Calcutta and Suez, without stopping at the intermediate ports in the Red Sea.

1297. Mr. *Crawford.*] Do you think that the circumstance of the necessity of transshipping that cargo at another port, for instance, a cargo laden at Mocha transshipped to another steamer at Galle, would be any objection in a mercantile point of view?—No doubt about it.

1298. *Chairman.*] What would be the objection?—There would be risk; and there might be legal liabilities.

1299. In what way would there be risk and legal liabilities?—I do not know how the underwriters would settle their risks in those cases.

1300. Mr. *Crawford.*] Do you know how you could discharge one bill of lading and give effect to another?—No, I do not.

1301. *Chairman.*] But do you think the knowledge of such transshipment at the port where the insurance is made would not be covered by some arrangement or other; it would be taken into the account of risk, I presume?—I have no doubt that whatever difficulties arise in a necessary case, they are met by the enterprise and the skill of merchants.

1302. Mr. *Mullins.*] You do not apprehend in this case any difficulty which could not be surmounted, seeing the great advantage of conveying goods of a certain description in as quick a time as possible to the Arabian markets?—I have no doubt, if a merchant felt it necessary to avail himself of that mode of sending goods, that any difficulty that might arise would be overcome.

1303. *Chairman.*] Do you know the present establishment of vessels in the Indian navy?—I think it is 11 or 12.

1304. Actually employed?—Actually employed.

1305. Do you know about what the annual expense of them may be?—My impression is, about 100,000 *l.* a year.

1306. Do you know generally how they are employed?—Their principal service has been checking the pirates in the Arabian Sea and in the Persian Gulf.

1307. Mr. *Crawford.*] Have not generally one or two of the best vessels been employed in the surveys of the eastern seas?—They have.

1308. *Chairman.*] Would not that service against the pirates be better executed by steamers?—An opinion to that effect has been expressed by the government of Bombay.

1309. Do you think that a steam establishment of that sort might not perform that service and convey the Bombay mails to and from Socotra?—It strikes me that the establishment for the conveyance of mails should be distinct from any other.

1310. Are there any pirates in the Arabian Sea?—There have been, but I have not heard of any lately.

1311. I believe they are confined to the Persian Gulf exclusively?—Principally.

1312. How many sea-going steamers are there in Bengal?—I think there are three.

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1313. For what purpose are they employed?—They are employed in communication with the eastern islands in a great measure; they are for the general service of the Indian government.

1314. They are inefficient steamers, I fancy, are they not?—They are not very efficient.

1315. Could they not be more advantageously employed in this communication? – I cannot say; the government of India are anxious rather to increase than diminish the number of steamers in Bengal.

1316. Do you know for what purpose?—I do not.

1317. Mr. *Mullins.*] Assuming that there was a restricted communication with Bombay alone, do you suppose that any passengers, not destined for Bombay, would be likely to avail themselves of conveyance by land? – Yes, I think they would; I can state that Dr. Brice, from Calcutta, lately availed himself of that route to come to England from Bombay; and I know of some officers who have availed themselves of it to return to India.

1318. Not accompanied by their families, but merely themselves?—No, alone.

1319. Can you form any opinion as to whether it would be safe for women or children to pass across the country between Calcutta and Bombay?— I never understood there was any difficulty.

1320. Do you think it would be advisable for them to venture?—I have no experience to guide me.

1321. Mr. *Crawford.*] Would you not rather think it a matter of expense than of convenience? – I should think so.

1322. Mr. *Mullins.*] Are you aware there are certain periods of the year when the passage is extremely difficult; periods of rain for instance? No doubt.

1323. Have you ever heard of any accidents occurring to the mails carried by dauk to either of the presidencies?—There no doubt have been occasionally impediments, but I cannot call to mind at this moment the occurrence of any particular accident.

1324. But is that the general opinion, that there are impediments occasionally occurring?—Occasional impediments, no doubt.

1325. Mr. *Crawford.*] They have not snow there, but rain in torrents?—Yes.

1326. *Chairman.*] Do you contemplate any political advantages from bringing India so much nearer to England, by shortening the communication one-half?—I have no doubt great advantages, political and commercial, would result to both countries, from the regularity and the facility of communication.

1327. Supposing that the expense was not a consideration, do you not think advantage would be derived if greater facility was given to the intercourse between the two countries by passengers?—I have no doubt.

1328. Can you point out what advantages would be derived from it?—Does your lordship mean political advantages?

1329. Yes, the political advantages? It strikes me that the home government of India, whether you consider it as initiating measures to be adopted in India, or as controlling or checking the measures of the local government, must derive vigour and energy in the proportion that the communication between the two countries is accelerated.

1330. And with respect to the facility that would be given to individuals?—The residents in India are principally employed in the Company's service, administering the government of the country, and I think everything that tends to their comfort must tend to the efficiency of their service.

1331. Do you not think that the facility that would be given to the civil servants of the Company in coming to England would improve them as public servants?—I think it is very desirable that the European servants of the Indian government should have the opportunity of renewing their English feelings and connexions.

1332. Mr. *Mullins.*] Then it is your opinion that they would all anxiously avail themselves of the means presented to them of coming to Egypt or England, in place of going to the Cape of Good Hope, which they are in the habit of doing under present circumstances?—The civil servants of India have a temptation at present to go to the Cape of Good Hope, in being allowed to retain a portion of their allowances, and, what is perhaps of more importance, the right to resume office on their return to India, and without prejudice to their time of service.

1333. Do you think it advisable to make such an alteration in those regulations

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lations as would enable them to come to England without detriment to the proportion of allowance which they have on going to the Cape of Good Hope?—I should be very apprehensive of the consequences of any extension of that regulation, which has by some been considered prejudicial as already acted upon in cases of absence at the Cape of Good Hope; it leads to the system of acting appointments in India, which is very much to be deprecated.

1334. *Chairman.*] But without holding their situations, and without receiving exactly the same allowances, do you think some arrangement might not be made for allowing them to come to Europe on similar allowances, which would not be very willingly acquiesced in by the servants?—Your lordship is aware that at present servants are allowed, after 10 years' service, to come to Europe on pay for a certain time.

1335. On furlough, that is; but the question applies to sick leave; they only go to the Cape on sick leave, and it is under those circumstances that they retain the portion, I think three-fourths, of their allowance; the question is, whether that would not be more acceptable to them, and more advantageous to the service that they should come to England, the time being the same?—It would be more for the advantage of the service, but whether it would be acceptable to them would depend entirely on the terms that might be proposed.

William Morgan, Esq., called in; and Examined.

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1336. Mr. *Mullins.*] WHAT is your occupation?—An engineer.

1337. Have you given your attention to steam navigation with India?—I have.

1338. Is it your opinion, from the inquiries you have made, that it is practicable at all times of the year?—Of course any opinion which I can give is founded on the opinions and the reports of others in respect of the state of the weather which prevails there; I have never been in India or in the Indian seas, and of course I must depend upon the statements made by nautical men who were partially also acquainted with steam navigation, and what steam power is capable of doing in those seas.

1339. You are well acquainted, I apprehend, with the nature of steam power, and the different improvements that have been made in steam machinery?—Yes, I am; it has been my exclusive study for many years past.

1340. Then, according to your knowledge, what sized vessels should you recommend for long passages in seas where there is a likelihood of meeting with extremely foul weather at certain periods of the year?—As a general proposition, and if expense is not at all to be considered, the larger the vessel the better; a large vessel overcomes the resistance of the waves, better preserves her way through obstructions, she is better enabled to exert the power within her than a very small vessel is; but the performances of large vessels for long voyages have not greatly exceeded, and in some instances have not at all exceeded the performances of small vessels.

1341. Then is it your opinion that as far as speed only is concerned, there will be no greater advantage arising from having a larger vessel than from having a smaller one?—A very trifling, indeed, a very trifling difference in the speed, an advantage unquestionably there would be; the resistance to a vessel of course will depend on the sectional area of the vessel immersed; it will depend also on the weight which has to be driven against the water, or rather on the quantity of water which has to be displaced to admit of her passage, and it will also depend on the dimensions which the better form of the vessel will make in the resistance, and that is generally obtained in greater lengths and in larger vessels.

1342. What sized vessel should you think best adapted for the steam communication from Suez to Bombay, or to Calcutta, or any of the presidencies?—I should consider that a vessel of about 650 tons burthen would be sufficient, and would give as great a chance of certainty as almost any other size.

1343. And what horse power?—Horse power is rather an indefinite term; but, however, assuming them to be built on weights which the usual computation is made upon, about 180-horse power, from 170 to 180-horse power, may be placed in a vessel of that size, so as to insure a very good average indeed.

1344. And you think that is the proper proportion of power to tonnage?—Yes, provided the displacement of the vessel is not made greatly to exceed, or in short to exceed very much her measured tonnage; a small vessel may be made to measure a great deal, and a large vessel may be made to measure a very little,

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little, from the improper mode of estimating the sizes of vessels, or of measuring them still in practice; but I am supposing that the displacement of such a vessel would be about 720 or 740 tons, and that her measurement would not be less than 100 tons less than that; I would not have a nominally small vessel carry a very large burthen.

1345. Then, in the opinion you have just given, you take that tonnage as the minimum, but is it your opinion that a larger vessel would be advisable?—Yes, if expense is not objected to, there would be greater accommodation; there would be perhaps some little increase on the average speed, but very trifling, nothing to compensate the expense.

1346. What do you think would be the expense of the construction of a vessel of 1,000 tons and 300-horse power in the cheapest mode that it could be accomplished, looking to the obtainment of the most perfect machinery at present in use?—About 35,000*l*.

1347. In what ports would you have those vessels built?—I should prefer building them in London.

1348. Do you not think they could be built more cheaply in the outports?—They might be, but not so well built. In general, they are very shallowly built; there are not such large stocks of timber to be had, workmen are not paid such good wages, and in consequence they do not work with that precision which they do in London. River-built vessels are always worth more money built in London than built in the outports.

1349. Then you think that although the expense in a London port may be greater, still that, looking to the durability of the vessel, it is more advisable to go to the extra expense than construct a vessel in the outports?—If I had to build a vessel myself, I should prefer doing it in London, under those circumstances.

1350. And you have stated, I think, that your opinion is, that a vessel properly constructed of the size stated, could not be done under 35,000*l*.?—Not embracing all the improvements and the best machinery; cheap machinery is extremely expensive in the wear.

1351. What boilers should you recommend?—I should recommend iron boilers, because I should recommend condensation by surface; it has now been so long tried by the best experiments, and has certainly succeeded.

1352. Do you think the communication with all the presidencies in India equally practicable as the communication with Bombay?—I should say more so; if there is a difficulty, the difficulty would be in extreme cases, in causing the Bombay boat always to reach Socotra. I do not see any difficulty whatever in making a vessel reach Socotra coming from Ceylon.

1353. You are aware of the impediments created by the south-west monsoon between Bombay and Socotra at certain periods of the year, and you are also aware that that wind blows with very great force; now looking to these points, what sized vessel should you recommend to be put upon that station particularly?—I have understood that the force of the monsoon, even at its worst, is scarcely equal to a south-west gale in the Bay of Biscay, or on soundings, and I have also understood that it is not of equal duration: a south-west gale I have known blow almost intermittingly three weeks, and the sea, which is brought in on the edge of soundings, is tremendous, it is terrific. Now I understand that the south-west monsoon only blows occasionally an extreme gale, that it seldom lasts more than 30 hours, and then it lulls and finally subsides altogether. Although the sea never goes down, there have been seasons where in the months of June and July, I think, the weather has had a more determined character, and the monsoon has continued with violence, although not with equal violence to the south-west gales here, still with that degree of violence which would certainly affect the progress of a vessel if she has her head to windward. Under those circumstances, I do not care what power it is that may be put into a vessel, she will not be able to stem the gale; that is, she would be able to stem it probably, but she could not carry a sufficiency of coal to carry her the whole way against it, however large she may be, for the consumption of coal rises very nearly with the power; there is only a very trifling difference in favour of large engines.

1354. *Chairman.*] You stated it was easier to go from Galle to Socotra than from Bombay to Socotra?—From Galle, if that was a good point.

1355. Mr. *Mullins.*] Will you state the reason why it is more practicable to

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go from Galle to Socotra than from Bombay to Socotra?—In one respect the wind itself is not a head wind for her. The course she has got to steer is off the wind; but by running a couple of degrees to the southward of that, she gets into a wind which perhaps is a favourable wind, and then makes her westings until the south-west monsoon becomes a fair wind for her, or nearly a fair wind. She would have to lay to north-north-west, then the south-west monsoon would be a fair wind.

1356. How many tons of coal per horse power do you suppose a vessel of the tonnage you before stated would be capable of carrying?—She would be capable of carrying about one ton and a quarter: that is, she would be capable of carrying more; but I should not think it necessary or proper for that voyage to put more coal into her, for the vessel may be, and we have had many instances of our Admiralty packets being overladen with coal when they started, and when they got to face the monsoon in their loaded state, they made no progress whatever; if she had less in her she would have done better, the vessel would have been livelier, and the machinery more effective.

1357. But looking to the perfectly effective state of the machinery, you consider a vessel of that size could carry a ton and a quarter?—About that.

1358. And what run will that quantity of coal enable a vessel to effect?—Working at full speed, and going on without any serious obstruction, making the best of her way, it would carry her for about 11 days, I think.

1359. What run for each day?—She would run about eight miles and a half an hour; that is, supposing it to be variable weather.

1360. That is, she would average about 200 miles a day?—Yes.

1361. That would be about 2,200 miles?—It would.

1362. *Chairman.*] Have you seen the Atalanta and Berenice?—Yes, I have seen them both.

1363. Do you consider them well calculated for the service for which they are intended?—The Berenice is certainly a very fine vessel; but I should not have put quite so much power into her, or so much weight into her, and have given her a greater rise in the floor; and I think I should have had at least as much speed out of her.

1364. Mr. *Mullins.*] Are you aware that the French have made any important improvement in the building of new vessels for steam navigation?—They decided on building vessels of about 620 tons measurement, and of putting two engines of 80-horse power each into each of the vessels, and they have obtained greater speed than any that we have to offer.

1365. *Chairman.*] Greater speed than the Volcano?—Yes, considerably.

1366. You know that the Volcano has made a very rapid passage lately?—Yes, I am aware of that; but one passage is by no means a criterion of what a vessel can do.

1367. Mr. *Mullins.*] In giving this opinion have you any papers or any authority to go upon?—I have the authority of the French engineers of the commission that is appointed to inspect the vessels, and the particulars of the dimensions of the vessels, and their performances. It appears that two of these vessels had an average speed in the ocean and in the Bay of Biscay of 8 knots and 800$^{\text{dths}}$ per hour, and in the Mediterranean of 8 knots decimal 936. Now, we have no average equal to that anywhere here.

1368. *Chairman.*] And what does that superiority arise from?—Of course within the last few years engines have been improved, and they have studied the form of the vessel; they have paid attention to the minutiæ; they have not overladen the vessel with weights, and they have likewise studied very much the form.

1369. Now, what paddles have they adopted?—They have the common paddle; these vessels have the common paddle.

1370. Mr. *Mullins.*] Are you aware that one of the Mediterranean packets was forced to put back in attempting to make her voyage from Falmouth a few months ago?—It has happened that one of them has done so; I do not recollect the exact period; but that one did not put to sea a few months ago when the mail arrived, I recollect; but it has happened before that such was the case.

1371. Is that a circumstance of frequent occurrence?—By no means frequent: I do not believe it has occurred three times, or at the utmost four times, since packets have been established; and the packet service was commenced with vessels built in the very infancy almost of steam navigation, and therefore not upon the most approved principles.

1372. Then

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1372. Then you do not consider all the Malta packets to be efficient vessels?—No, not such as would be built if they were now to be laid down; but many of these vessels were built 12 years ago, and in the last 12 years it is that we have learnt something of navigation to distant parts.

1373. But they have got some new packets, have they not?—They have.

1374. Are you acquainted with the rate at which those packets go?—The fastest one averaged 7 3-4 knots; that is the Ballaser.

1375. You are aware of the distance between Socotra and Bombay?—Yes, it is about 1,200 miles, rather better.

1376. Then if, according to your calculation, a vessel will take fuel without overloading, for 2,200 miles, what impediment or difficulty is there in such a vessel accomplishing the passage by headway, between Bombay and Socotra, or for similar distances?—Because that sufficiency of coal for 2,000 miles was calculated upon the average speed obtained by these French packets, but if the vessel is to be opposed to a continued resistance the whole way, that average speed will wonderfully change; she will have steerage-way, and then that whole quantity in place of being a sufficiency for 2,000 miles, will not be a sufficiency for 1,200; she would not have four knots and a half; for instance, her mesne speed and that quantity of coal would not suffice for 1,000 miles; she would require three miles an hour to steer, and if she has only steerage-way on her that quantity of coal will not carry her a long distance.

1377. Then you think, under any circumstances, it would be advisable for a vessel communicating between Bombay and Socotra to make southings?—Yes, if the weather is dead against her.

1378. I mean in the south-west monsoon?—In the event of a continuous and violent gale against her, then of course her business would be to run to the southward; but if it were only conditional, on the continuance of the weather, then I should say it would be necessary for her to go to the southward.

1379. Do you think it would be advisable that vessels constructed for such voyages should be made effective sailing vessels as well as steamers?—If you make them what sailors term effective sailing vessels, they are non-effective steamers.

1380. Are you not aware that the Medea is a good sailing vessel?—I am aware the Medea was built as a cruiser to accompany the fleet, and required to be more under sail than under steam; had she been solely built for a steamer, her performance as such would be very much better than it is, because she would be relieved from her top hamper.

1381. Now, according to your calculation, how many vessels do you consider will be required for the entire line between Falmouth and the three presidencies?—There would be 12 vessels required to be in constant motion.

1382. How many between Falmouth and Alexandria?—As an establishment, five.

1383. And from Suez to the different ports of India?—You would require eight, and I should say three spare vessels, because an accident may occur; a vessel may be under repair, and there ought always to be a spare vessel to make certain of it.

1384. How many would you have between Suez and Bombay for a monthly communication?—Five.

1385. Is it your opinion that less than five would answer for keeping up the communication efficiently?—I do not think it would; I am satisfied it could not for long, whatever their power may be.

1386. Will you state your reasons for so thinking?—Engines require frequent repose and frequent cleansing; if any little defect begins to show itself, and it is put off, that defect not only increases in the course of working very rapidly, but it induces others. The distance from Bombay to Suez is very nearly, I think, the same distance as there is between Alexandria and Falmouth, and we have found that the Admiralty have not been able to keep up that communication without having five vessels to do it. There is one vessel constantly between Malta and Alexandria, and there are four vessels that are off and on constantly between Malta and Falmouth; one occasionally under repair; if there are three taking alternate trips, there is one under repair almost constantly; when I say five, I might say six; because, having a number of them, if the Atalanta vessel becomes defective in her machinery, and requires to be sent home, another is taken out to take her place while she is being repaired, so that less than five

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would not give a certainty. Then the great heat of the climate is likewise to be considered; if you have a few vessels to do the work, the men will be overworked or worked beyond their capability of standing it; the heat of the engine-room is very great indeed, and it relaxes them so completely that they require a great deal of rest before they are enabled to do the work which the engine requires of them; it is not like these cold climates; I have known men lifted out of the engine-room, hauled out of the engine-room actually exhausted during the heat there in the Mediterranean or the Adriatic. The heat of the Red Sea is considerably greater than that in any part of the Mediterranean from what I have understood.

1387. And, of course, you think they will require more rest?—They will unquestionably; it is not only the engine which requires rest and cleansing but the men themselves require a great deal of rest.

1388. Then how many vessels would you have between Socotra, taking Socotra as a central point, and the other presidencies?—Four vessels would be enabled to communicate with Calcutta from Socotra.

1389. With Calcutta, Madras and Ceylon?—Yes; but I should prefer allowing them a spare vessel.

1390. Should you think it advisable that all those vessels, I mean on the eastern side of the Mediterranean, should be of one size?—Yes, and the machinery similar; all duplicates. All the wants for the vessels would, under those circumstances, serve almost indifferently the one for the other. It would be perhaps impracticable to get them all exactly alike, and no two engineers make engines precisely similar; but they ought to be just as nearly alike as possible. It likewise will enable the person who has the establishment in charge to apply the vessels to any particular station, where one may be required, and withdraw any vessel from that station which may require repair. The Red Sea will require less power in itself to overcome its difficulties than the ocean would, but then we are to suppose that there will be a greater number of persons embark on board the Red Sea boats, a greater quantity of parcels and packages, so that that which is not wanted by reason of the obstruction or the violence of the weather, is required by reason of the other wants of that particular station.

1391. Have you made any estimate of the probable expense of a general communication with India?—Yes; I assisted in making part of an estimate for that purpose. Major Head and the gentlemen of the provisional committee called upon me to furnish them with some particulars, and in so far as the engineering department was concerned, I did furnish them particulars.

1392. Then you have no further information to give upon that point in addition to what has already been given by Major Head?—I presume not.

1393. You furnished him with those particulars, and he has given them in; what distance should you recommend the steamers, of the size you propose, to go without requiring to replenish their coal?—The shortest possible stations for all the steamers. I have known one instance, that is, I have it on report, I was not present, but I have it on such report as I have every reason to place faith in, that a vessel sailing from Falmouth with the Mediterranean mail has been worked at an hourly expenditure of fuel, in the first instance, of 14 bushels an hour, and before she has reached Gibraltar been consuming 19 bushels. That was from the accumulation of the saturated solution, from the deposit in the boiler, and from the inertness of the men.

1394. *Chairman.*] From the deposit of salt?—From the deposit of salt and from the joints becoming loose, the packing being worn, and the inertness of the men altogether, all causes combining; the shorter the distance that is run the more economical the vessel becomes, the longer she lasts. We have better performances from the same sized vessels. The Dundee and Perth have made very good voyages, running between Dundee and London, for instance; but place those vessels between London and Gibraltar, and the average consumption of fuel will increase; it is simply from those causes.

1395. Then your opinion is it would be advisable to have as many depôts as possible in that communication?—Certainly, to have short stages, and to relieve the vessels as frequently as possible, not to make a vessel take the mail at Suez and go on with it to Calcutta, but if possible not to allow one vessel to be at sea continuously for more than five or six days if practicable; but that is not practicable, but at any rate to limit it as much as possible.

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1396. Mr. *Mullins.*] Then, looking to the expense of the establishment of the various depôts, you consider that that expense would more than be counterbalanced by the greater length of time the vessels would be likely to last?—And the wear and tear will be very sensibly less.

1397. Have you any idea of the annual expense of one of the Mediterranean packets?—None in the world; I have not the slightest idea what the expense is.

1398. How many passengers do you apprehend a vessel of the size you have described (of 650 tons) would be capable of taking, independent of fuel?—About 45 aft-passengers and 25 fore-passengers, between servants and masters about 70 persons.

1399. But how many could such a vessel accommodate with convenience and perfect comfort?—About that number.

1400. Do you mean cabin passengers?—All of them cabin passengers, only some of them fore-cabin passengers and others aft-cabin passengers, between masters and servants; I suppose that some persons carry servants; all persons are counted passengers, although they are in different situations.

1401. Do you suppose that a vessel of such a size would be enabled to carry a general cargo, independent of the passengers' luggage, and also independent of the fuel?—Certainly not; not to maintain anything like a fair average speed.

1402. Then what additional tonnage would you give a vessel, looking to the advantage of reserving a certain tonnage for the conveyance of merchandize?—These vessels would be calculated to carry about 20 tons, because I always understood it was merely parcels and samples and objects of value, which go into a small space, and are not weighty.

1403. Looking to the conveyance of a more general cargo and a heavier one, what sized vessel should you think it advisable to adopt?—Then of course we must increase the size.

1404. Supposing you had a vessel of 1,000 tons, and a proportionate horse power, what tonnage would such a vessel have spared for a cargo, over and above the quantity of fuel necessary?—She would have very little more comparative room, if we were to put power into her in the proportion which the vessel's power bears to the vessel's size.

1405. How many tons do you calculate; you can form an opinion as to that?—To obtain the same average speed that this vessel would, she would not do it; I could not put any more in.

1406. Then I understand you to state you must diminish the vessel's speed if you give her any more room for cargo?—Yes, certainly.

1407. Of course, the witness understands that the question put to him is with reference to the distances those vessels would have to go in communication with India?—I suppose they are to communicate with the several points on which I have been already questioned. And you cannot put weight into a vessel without sinking that vessel, supposing it to be the same vessel: for instance, you cannot put extra weight into that vessel without sinking her more in the water; by immersing her more in the water, the greater duty she has to perform, and with the same power, she cannot perform that duty with equal rapidity.

1408. But considering that a vessel may not have to go at the farthest more than 1,600 miles, do you not suppose that the quantity of fuel might be diminished with safety, so as to admit of greater room for the conveyance of a cargo?—If you diminish, you must replace that weight.

1409. But with safety, looking to the possible obstacles from contrary winds, for instance, that the vessel may meet with?—Not from Bombay, in the monsoon; you might diminish it from Ceylon, but in no great degree during the monsoon: at any other time of the year, in variable weather, then you may diminish the quantity of coal and immerse the vessel equally by a cargo.

1410. Have you turned your attention to any of the late improvements in steam machinery?—Yes, I have.

1411. With a view to the curtailment of space in steam vessels?—I have seen most of the plans which have been brought forward.

1412. Is there any of those plans that you could particularly recommend?—I do not think there is any that has yet had that test of experience which would justify me in recommending it to the Committee.

1413. Have you any acquaintance with Mr. Collyer's boilers?—I have seen them.

1414. Are you aware that a vessel has been fitted with Collyer's boilers, by order of the Lords of the Admiralty?—The Pluto.

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1415. It was tried?—It was tried. I saw the boilers when they were fitted, and I saw them after they came out.

1416. Do you know the vessel against which this vessel was tried: the Meteor, I think it was?—The vessels are very dissimilar.

1417. Did you understand how many knots an hour the Meteor made passing down the river?—It is so long since that I cannot carry it in my mind; I cannot recollect that at all.

1418. Are you acquainted with Hall's patent condensers?—I am.

1419. What is your opinion with regard to their application?—I think it is a most valuable improvement, and one that I almost should say is absolutely necessary to Indian steam.

1420. Are you aware it has been stated as an objection to them that it renders the machinery much more complicated, more difficult to put in order if once it gets out of repair?—It may have been so stated: I do not see in what respect it injures the rest of the machinery, but they may be applied to engines without altogether preventing the common condenser from being fitted to the vessel likewise, should anything occur to them, recourse may be had to the common mode of condensation.

1421. Are there any of the Government vessels already fitted with those condensers?—I believe none; the Government did order one set of engines to be fitted with them, but I believe those engines are not yet erected in the vessel: I do not believe the vessel is launched yet.

1422. Do you know any other vessels to which they have been applied, and found to succeed?—The Hercules, belonging to Liverpool, I think, at any rate built at Liverpool, which runs from London to some port in Ireland now, and has done for a long time, I think to Cork. I was informed by the engineer of the Hercules, whom I questioned upon the subject, without his knowing who I was or that I was at all connected with steam machinery; I inquired of him on one occasion when I had known they had opened their boilers after many months' use of the condensers, and I asked him in what state he found the boilers; he told me they were as clean then (they had been working them for seven months) as they were the day they were put into the vessel; and the same or similar statements have been made by other persons who have had opportunities of inspecting these boilers. There are several other vessels; I do not carry in my mind now the numbers, but they have been now under experiment, if I may so say, for two years; and I do not know any one instance in which they really failed.

1423. Then it is your decided opinion, as a scientific man, that those condensers have been found to answer the purpose in every respect?—I should say, certainly.

1424. And that the experiments have been sufficiently tried to justify you in recommending them to be applied in those new vessels about to be built for steam communication with India?—I should say, certainly; I have no hesitation in saying that.

1425. In the Hercules, the vessel you named, is the boiler iron or copper?—Iron; and it is a very great advantage indeed presented by Hall's condensers, that it enables you to retain the use of iron boilers, because iron boilers are certainly stronger than copper ones.

1426. And you do not apprehend the same liability to accident with an iron boiler, while using Hall's condensers, that you would with an iron boiler without them?—No question about it, because it totally prevents incrustation, and it renders the Welsh coal more valuable.

1427. Are you aware that there exists a very essential difference in the nature of the water of the Red Sea and the Indian Ocean; that in the one sea the water is much more saline than the other; has a greater proportion of sulphuric acid and lime?—I suppose the water of the Red Sea would be the most impregnated; I should imagine so, there being no rivers discharged into it, and the evaporation being very great.

1428. Assuming that to be the case, of course you are aware there would be a greater liability to incrustation?—There would, under those circumstances.

1429. Then any difficulty likely to arise from the necessity of often blowing off under such circumstances would be completely obviated by the use of the patent condensers?—Yes.

1430. And do you contemplate any case in which it is possible that incrustation may arise?—There can be no possible way in which it can take place, because he resorts to the very ingenious plan of distilling water from the sea

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water in a separate vessel; whatever deposit there is takes place, that is in a separate vessel, so that the boilers and the engines are worked with pure water. It is not only the boiler, but the engine likewise, which will suffer very much from the hot salt water: the injection of sea water impregnated into the condensers, in the course of time, injures the effect of the engine, and likewise destroys the condensers.

1431. In Collyer's boilers there is one improvement, which I should think applicable to any steam-engine; I wish to know whether you are acquainted with the safety or breathing pipe, so called by Mr. Collyer?—No, I do not recollect it.

Jovis, 6° *die Julii*, 1837.

MEMBERS PRESENT.

Lord William Bentinck.
Mr. Gordon.
Mr. Hutt.
Mr. Mullins.
Mr. Young.

LORD WILLIAM BENTINCK, IN THE CHAIR.

Samuel Briggs, Esq., called in; and Examined.

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1432. *Chairman.*] WHAT are you?—A merchant in London, of the house of Briggs, Thurburn, Acraman & Co., and at Alexandria, in Egypt, of the house of Briggs & Co.

1433. How long have you resided and been engaged in business in Egypt, and are you now engaged in any house or firm there?—My connexion with Egypt commenced with the conjunct expedition under Sir Ralph Abercrombie and Lord Keith in 1801, and on the evacuation of the country by our forces at the peace of Amiens I was appointed His Majesty's consul at Alexandria, in 1803. This office I resigned in 1810, but established a commercial house at that port, and have visited the country four times since. I have resided in it at various periods more than 12 years, and my house still continues there, under the firm of Briggs & Co.

1434. During that time, had you ever occasion to go to any part of India, and are you generally acquainted with the commerce of India and the Red Sea as it has existed during your residence in Egypt?—About 20 years ago I visited Bombay by the route of the Red Sea, embarking at Suez and returning by Cosseir. It was an object with the Pacha of Egypt (the same who now governs the country) to open a commercial intercourse with India, in which he embarked largely himself, but the moment was very unfavourable (from 1817 to 1819), and the trade was relinquished; it was at the period when the free trade was in full operation, both in India and in England. The natural consequence of this sudden competition was, throughout India, a great depreciation in the price of imports, and a large advance on all exports, which produced ruinous effects in England and throughout Europe as well as in Egypt. The fiscal regulations of the Egyptian government would, under ordinary circumstances, have defeated the enterprise, as a duty on imports from India was levied of nine per cent., including custom and escort duty, besides two Spanish dollars per camel load of goods in addition to the regular hire.

1435. Are you aware of any political or fiscal regulations of the Viceroy of Egypt which would in any degree impede the progress of passengers, or such merchandize as is likely to pass by steam navigation through Egypt to India?—The Pacha of Egypt, Mahomed Ali, has always been friendly to a commercial intercourse with India as well as with Europe, and is disposed to afford every protection to trade across the Desert to Suez, and by the route of Cosseir and throughout the Red Sea, wherever his power extends. To insure, however, his cordial co-operation, it would be necessary to enter into a special negotiation on these points; all depends on his will; he can promote or thwart the trade at pleasure; but by the favourable dispositions he has always manifested towards England, much may be obtained by tact and conciliation. To passengers going to or coming from India the Pacha has uniformly given every assistance, and they have passed through his territories as safely as through any part of Europe. The nullity of the trade in English ships under the former onerous

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duties, and the more enlarged views of commerce and politics now entertained by the Pacha, may possibly induce him to consent to a modification of the custom duty, and place it upon the same footing at Suez and Cosseir as at Alexandria.

1436. Would the Viceroy of Egypt be likely to grant permission for the free transit of all goods across the Isthmus for re-exportation, without the necessity of opening the packages, on the payment of a moderate sum in the gross per annum, or for a moderate *ad valorem* transit duty on an English custom-house certificate, or in any other mode which you can suggest, by which the opening of packages in passing through Egypt would be avoided?—The transit of merchandize through Egypt for re-exportation without opening the packages could only be arranged by special agreement with the Pacha; but he possibly might be induced to allow such transit on trial for one or two years, on payment of a fixed sum in the gross per annum, or for a moderate sum *ad valorem* on an English custom-house certificate, care being taken that the full duty be paid on all goods intended for the consumption of the country.

1437. Do you think he would willingly enter into such a negotiation?—I do.

1438. What are the articles of merchandize which in your opinion are the most likely to be conveyed by steam vessels from England to India, and *vice versâ*, in the event of a regular monthly communication being established between the two countries?—In ordinary times, such goods only as are of comparatively small compass and great value could be expected to go by the Desert to Suez and India, as all heavy goods of comparatively small value would continue to go by the Cape. When the communications by steam become regular, and confidence is established, no doubt both imports and exports by the Red Sea would progressively increase. The articles likely to take that route are coral, cochineal, both of Turkey and Egypt, quicksilver from Trieste, fancy silk stuffs and fine manufactures, white lead, foil or tinsel, of which there is a large consumption, bullion, books, periodicals, &c. to India, and from India, raw silks and silk goods, indigo, shell lac, cloves, cassialignea, cinnamon, nutmegs and other spices, pearls, tortoiseshell, Cashmere shawls, gums, tea, coffee, pepper, aloes and other drugs.

1439. In the event of the packages not being opened in Egypt, would there, in your judgment, be any danger from plague or other infection from goods imported into England or India, conveyed in closely soldered tin boxes, enclosed in wooden cases, iron-bound, or not corded, such goods being originally shipped at a clean port?—Goods originally prepared at a clean port in Europe, if closely soldered in tin cases, or enclosed in oil-skin covers and strong wooden cases, iron-bound, without cords externally, can be in no danger whatever from plague or other infection, if suffered to pass through Egypt unopened, that I can speak positively to.

1440. What interruption does the plague give to commercial transactions and intercourse amongst Europeans in Egypt; at what season of the year does it chiefly prevail, and does it ever entirely cease; does it periodically appear every year, or for how long does it occasionally disappear?—The plague does sometimes in the spring months interrupt trade among the Europeans and native Christians in Egypt, particularly in manufactures and such articles as are supposed to be susceptible of contagion, but whenever it does prevail in spring, it always ceases in summer (and that I speak from a long experience there) with the great heat, at Cairo and in Upper Egypt about the end of June, and at Alexandria and in Lower Egypt about the end of July; during the remainder of the year the country is generally free from plague and is healthy. At intervals the plague ceases altogether for eight or ten years, as from the year 1803 to 1813, and subsequently at other intervals; after a total cessation of some years it usually is very destructive the first year that it breaks out again, but the principal victims are the diseased, dissolute, ill-fed and dirty natives of the lower orders, and Europeans of the same description. It very rarely attacks the middle and upper classes, who are temperate and cleanly in their persons and habits, though exceptions are sometimes to be found. After the first year, when the most diseased have been swept away, if it does show itself in the following spring it is generally of a milder character, and always ceases at the summer solstice; and though it may re-appear for a succession of seasons, from March to June, and sometimes in January or February, it gradually loses its malignancy, until the

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disorder becomes extinct for a number of years. In ordinary seasons it is not more fatal than typhus, cholera and some other maladies which periodically visit Europe. With the exception of the month of March to the end of May, when the river Nile is at the lowest and the hot winds prevail, the climate is one of the finest in the world, though in general it is supposed to be one of the worst. Few climates can be compared to Upper Egypt from October to February, as it rarely or never rains, and the country is covered with verdure and freshness. In summer the Upper country, and indeed all Egypt, is exempt from rain, and the weather is hot, but at Alexandria and in Lower Egypt the cool refreshing winds from the north and west set in regularly from the summer solstice to the equinox of September, and the heat is then never oppressive. The Nile rises from June to October, when the rains of the south-west monsoon fall in Abyssinia, but never in Egypt, which is fertilized by the river. Alexandria and the Mediterranean coast is exposed in winter to rain, like any other part near the sea, but it rarely extends more than 30 or 40 miles inland. Much merit is due to the Pacha of Egypt for his endeavours to prevent the introduction of the plague into the country from Constantinople and other parts of Turkey and Barbary, whence pilgrims to Mecca frequently come in great numbers, closely stowed on board small vessels, with scarcely any comforts, and where fevers and other disorders are generated, and frequently degenerate into plague. It has often been traced to these swarms of pilgrims that come from Constantinople, and from Algiers, Tripoli and Tunis, by being crowded on board vessels. At the recommendation of the European consuls resident at Alexandria, not only did Mahomed Ali, the Pacha, consent many years ago to establish quarantine regulations at Alexandria, but delegated his authority in those matters to a committee composed of the foreign consuls and other experienced individuals, so that the danger is much diminished to what it was 30 years ago. There is no want of medical attendance in Egypt, and some of the English and French doctors have fearlessly and successfully treated many plague patients.

1441. What would you suggest as the best mode and route of crossing the Isthmus of Suez from Alexandria, and in what period might it be done by passengers without extraordinary fatigue and inconvenience; and would the same time be sufficient for the conveyance of such merchandize as would be likely to pass by that route?—The Isthmus of Suez to Cairo, like the Desert between Cosseir to Keneh, or Thebes, on the Nile, can be crossed at all seasons without any particular danger or extraordinary fatigue or inconvenience, if passengers are provided with tents, and take with them the necessary supplies of provisions, water, wine and their usual comforts. The journey from Suez to Cairo is usually performed in three days, sometimes, with light baggage, in two days, the distance being 72 miles. A special messenger, by dromedary, may perform the distance in one day, and even less; the route by Cosseir, either to Keneh or Thebes, on the Nile, is about 125 miles, and the journey generally occupies five days; both roads are of hard gravelly sand, fit for carriages, with trifling exceptions, which could be removed without any great difficulty. No carriages, however, are to be procured in the country, though the Pacha and some of his court have of late years introduced several from Germany and England for their own private use. The only present mode of conveyance for baggage and merchandize is by camels, and for passengers by mules, horses, dromedaries and asses of a superior breed; all these have easy paces, but the motion of the camel is very laborious, so that this patient, useful animal is seldom used but for the transport of baggage; its usual pace is two miles and a half per hour; though the other animals travel quicker it is not prudent for travellers to separate from their supplies, but they may let them proceed on for an hour or so before them. In the Desert between Cosseir and Keneh or Thebes, on the Nile, the difficulties which formerly existed, for want of water, have of late years been removed, as two English borers, with a Swiss mineralogist, were employed for two years, 1831 and 1832, in sinking new wells and deepening the old wells, so that now there is plenty of water along the whole line of 125 miles, at convenient distances; so much so, that when the old wells formerly yielded in 12 hours only a scanty supply of five to eight skins of dirty water, there is now a regular supply of eight feet deep by eight feet in diameter, in 12 hours, quite enough for a small caravan. This undertaking was patronized by the enlightened ruler of Egypt, and by his no less energetic son, Ibrahim Pacha, who afforded a native guard and every protection to the two English

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borers and their assistants, who were sent out from England with the necessary implements, and employed in the deserts during more than three years, at the expense of an English gentleman connected with the country, in the hopes it would be of permanent benefit to travellers to and from India, as well as to the numerous pilgrims to and from Mecca; for Mecca and all the coast of Arabia is supplied with corn by this route. Several attempts for water were made in the Desert, between Suez and Cairo, by the same parties, and in one place, about midway, with partial success; but after constructing galleries communicating with the shaft to collect the water, it gradually disappeared, so that there is no water in the whole course of 72 miles, except in the vicinity of Suez. It is very likely the partial success which has attended these excavations may induce the Pacha of Egypt to prosecute further attempts, both in Egypt and Syria; and in fact, at his desire, 10 boring drills were sent out to his Highness in the year 1833, the iron rods for which were to be made at his own foundries. I have crossed myself the Desert of Suez three times, in the hottest part of the year, in July and August, and the Desert of Cossier once, in the month of June, without suffering any particular inconvenience: even at that season the nights are chilly, and it is advisable to be provided with cloaks and blankets, for many persons are disposed to travel by night in preference, though the sun is very powerful by day, and the heat is increased by the reflection of the sands; the dews are also very heavy. The introduction of palanquins, with Indian bearers, for the use of ladies, or even gentlemen, would be a very great accommodation, and probably would be patronized afterwards by the Pacha and his court, and be the means of inducing several sets of bearers to settle in the country, which would materially facilitate the intercourse between India and Egypt. This might likewise be promoted were the Pacha to encourage the settlement in Egypt of part of the redundant population of Indian Mahometan labourers: they come up to Mecca to perform their pilgrimage, and were he to encourage them, for the cultivation of the soil, I think that it would facilitate the intercourse; the numbers of natives having of late years been very much drained for recruiting the army and navy of the Pacha, to the detriment of agriculture, the source of the wealth of Egypt. Many hundreds of Maltese labourers and artisans have for years been settled at Alexandria and Cairo, and obtain a livelihood which they could not obtain in their own island; and an arrangement with the Pacha for encouraging Indian settlers in the upper provinces would be likely to prove beneficial to both countries, and cement the connexion between them.

1442. Are there any roads, or might they be readily constructed, by which carriages could pass any portion of the distance from Alexandria to the Red Sea, and by what route?—When I quitted Egypt, six years ago, there were no carriage roads between Alexandria and the Red Sea, but they might easily be made between Cairo and Suez, and between Keneh and Cosseir, in Upper Egypt, were the Pacha to give his sanction and co-operation; and that he is so disposed I know, for five or six years ago I sent out to one of his officers an English stage-coach, by his particular desire, and he then had the intention of making roads. He has had carriages for his own use, and I am now going to have built here two landaus on purpose for him, which shows he has had the disposition, though it has been deferred; but if once he sees the advantage of it he will do it. The usual route for travellers and goods prior to the year 1820 was by sea, in the country boats, from Alexandria to Rosetta, on the Nile, and thence in other boats by the river to Cairo. But since the formation by the Pacha of the famous canal of Mahmoudia, which leads from Alexandria across the country to Atfe, opposite Foue, on the Nile, it saves one-third of the distance to Cairo, besides avoiding the dangerous bar or bogas at the mouth of the river. All passengers and goods go by the canal to and from Cairo, and thence by Suez or Cosseir to the Red Sea, as described in answer to Q. 1441. The Pacha has had it in contemplation for some time to construct an iron railway across the Isthmus from Cairo to Suez, and has had part of the rails prepared in England and sent to Egypt.

1443. Is there any danger or difficulty in passing through Egypt at present, either from the Arabs in the Desert or otherwise?—There is no danger nor difficulty to be apprehended, from the Arabs in the deserts or otherwise, in passing through Egypt, nor has there been any for more than 20 years, owing to the vigorous government of the Pacha. The casualties are of very rare occurrence, fewer than in many parts of Europe; as in our days we recollect highwaymen at Hounslow, so 20 years ago there used to be irruptions in Egypt, but latterly there have been none.

1444. Being well acquainted with the commerce of Egypt and India, as well as of Europe, what do you consider would be the ultimate, as well as the present effect, in a commercial view, of establishing a regular monthly steam communication between England and India; in the course of a short time, do you consider that many articles of commerce which now only find their way round the Cape would be conveyed by such steam communication direct?—It is my opinion that if a regular monthly steam communication between England and India be established, many articles of commerce will be conveyed by such steam vessels which heretofore have been sent by the Cape; but no heavy bulky goods of comparatively small value would take that route under ordinary circumstances; nor do I think it would be desirable, as it would have a tendency to injure our shipping interests engaged in the trade by the Cape, and consequently would affect one of our best nurseries for seamen, considerations of primary importance to a maritime power like England.

1445. Do you consider that the insurance of articles by the steam communication would be heavier or lighter than what is at present paid round the Cape? —In general, insurance by steamers may be effected cheaper, or at the same rates, as by sailing vessels; but between England or any Mediterranean port and India by the Red Sea there are other considerations which may materially affect the premiums; for it would not be one continued unbroken voyage, as from London round the Cape to Calcutta, or other port of India, but the goods shipped at London would first be discharged at Alexandria, then loaded in boats by the canal of Mahmoudia, to proceed by the Nile to Cairo, where they would be landed again, and thence loaded by camels for Suez to be reshipped for India; the breakage and damage to which many packages would be subject by such frequent loading and unloading the goods, and which is repeated at every halt of the camels during the three days' passage of the Desert, would greatly increase the risk of the underwriters, who may be expected to demand a high premium, or to be exempted from all average, which would in many instances operate against this route.

1446. Suppose a necessity to exist, owing to the existence of plague or war in Egypt, for pursuing a course up the Gulf of Akaba, instead of the Gulf of Suez and crossing the Isthmus to the Mediterranean Sea, do you think any difficulties would be encountered in that route, either in crossing the Desert or otherwise; and to what part of the Mediterranean would you advise that the steamers from England should go?—Were the plague to exist in Egypt in any violent degree, which rarely happens above once in eight or ten years, though it may in a milder form prevail for a succession of years in the spring months, despatches may still be sent *via* Suez, in perfect safety, in tin or wooden boxes, iron-bound, as mentioned in answer to Q. 1439; small valuable parcels packed in the same way would be equally safe; but merchandize in general it might be prudent to suspend shipping, unless packed in oilskin or wooden cases impervious to the air, supposing that an arrangement could be concluded with the Pacha to pass through Egypt unopened, on payment of a specific sum, as mentioned in answer to Q. 1436. The route by the Gulf of Akaba to the Mediterranean shore is very little frequented, and from its greater distance in the Desert to the seat of government is more difficult to protect; besides which, there is no safe sea port in that direction on the Mediterranean, though anchorage may sometimes be afforded at El Arish, to the eastward of Damietta.

1447. Mr. *Mullins*.] In your answer to a former question, you stated your opinion to be that in consequence of the frequent changes of packages from one mode of conveyance to another there might be a greater risk, and in consequence a higher degree of insurance?—Yes.

1448. Do you not suppose it would be possible to have a different mode of packing and preparation of the different articles, so as to prevent any of those consequences which you appear to apprehend?—It is possible, certainly, to alter the packages and make them more secure; there may be some few exceptions.

1449. In the case of quicksilver do you not suppose it possible?—Yes; they do pack it in iron bottles. I think when once the trade is commenced that many improvements may be introduced.

1450. In fact, that those risks that you apprehend may be met by an alteration in the mode of packing?—Yes; that I dare say it may, in a great measure.

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1451. *Chairman.*] You have no doubt of the disposition of the Pacha to give every facility?—No, that I am certain of. It is only a question if he is expected to guarantee this route, or if we will take the chances, as through any part of Europe; he will protect as far as possible, but he would not guarantee in case of plunder that he should make good any loss; if there was a duty stipulated for that, or if he undertakes this iron railway, he probably will say he will take the usual custom duty; but as you pay for canals and railways in England, so he must there have a remuneration. That must be negotiated personally with him.

1452. But you do not consider there is more risk in passing through Egypt in the route described than in any other part of Egypt?—Not at present, nor for 20 years back I do not see there has been any danger at all.

1453. You have stated, so long as the present Pacha lives, and during the reign of his successor, should he ever attain to that dignity, that there is no likelihood of an interruption to the intercourse, but rather an encouragement of it?—Perfectly so.

1454. Do you not suppose that, under any circumstances, it would be matter of interest to the governor of Egypt for the time being to encourage a communication with India? Certainly, provided no civil wars arise; that is all that I apprehend. We have known Egypt in a state of great confusion when the Mamelukes commanded; and when a civil war rages in the country there is no security. It is then that the Bedouin Arabs rob and plunder every caravan; they cannot be controlled; but so long as the governor continues as vigorous as Mahomed Ali, and his son, Ibrahim Pacha, there is no danger whatever. The Arabs never were, for ages back, controlled in the manner they are now by the Pacha; he has organized them, and they see their interest in it.

1455. And you think it likely that from the example previously set, or the great benefit resulting from the present mode of government, it is likely that that mode of policy would be preserved, under any circumstances and under any governor? I should hope so. But I apprehend the Sultan has so great an interest in regaining possession of Egypt, that it may give rise, if he does make any attempt, to throwing everything into confusion, and may produce civil war again. It appears the Pacha has been negotiating at Constantinople to be recognised, himself and his successors, as hereditary governors of Egypt and Syria, on paying a tribute; and there was a disposition apparently on the part of the Sultan to accede to that, and to allow Ibraham, if he succeeds, to possess all the power of the country, for the Pacha would wish to see it hereditary in his family.

1456. From your knowledge of Egyptian policy, is it your opinion that any other of the European powers may exercise influence sufficient over the Pacha or his successor to induce them to alter their present policy with regard to England?—I am not of opinion that any power could do it, unless cause of dissatisfaction were given by England; but it is, I know, the policy and the disposition of the Pacha to encourage a friendly intercourse with this country, notwithstanding all the overtures of Russia and France. I am certain that from the power which England possesses on the Indian Ocean as well as the Mediterranean, we might crush his fleets whenever we pleased, and he is sensible of it; but independent of that, I am sure his own individual feeling is in favour of England; we court him less than Russia and France, who in professions are very liberal always, but he is very politic and shows great attention to those powers, though in fact his feelings are in favour of England, I can vouch for it.

1457. In an answer you gave to a former question, did you mean to recommend particularly the route between Cairo and Suez in preference to the route between Keneh and Cosseir?—Yes; that is the most frequented and the shortest across the Desert. The other is more pleasant, perhaps, to passengers; gentlemen who come from India, and have got time to spare, by going to Keneh and Thebes, have the opportunity there of seeing the finest antiquities in the world; there are none in any part of Europe to be compared to them; and all down the Nile it is a very pleasant navigation; if they go for the benefit of their health, for the winter there is just like the spring of Italy.

1458. In the event of water not being found on the passage between Cairo and Suez, do you apprehend that the want of it would present any serious objection to the communication between Suez and Cairo?—No, I do not apprehend

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hend that, for it has always been carried on. There are more difficulties, of course, but then they must take their supplies with them. If water was found there it would then become a regular route and there would be no difficulty whatever; in fact, you might drive a curricle all across that desert; there is only just one or two spots, extending not many yards, where you might blow up the rocks; the rest is a fine hard road.

1459. Do you know whether a wheeled carriage ever crossed it?—Yes; the Pacha has passed it with some of his family, when he went himself to Mecca; on his return the carriage was sent there for them; that was many years ago.

1460. What description of carriage was it?—A kind of English barouche.

1461. A heavy carriage?—A heavy carriage; a four-wheel carriage.

1462. Drawn by what animals?—Drawn by horses; they are excellent horses in Egypt, only you must have your supplies of water and provender for them.

1463. Up to what period does your information regarding the search for water extend?—Not subsequent to the year 1833: the borers came home at that period.

1464. Are you aware that a search has been made since that period and water discovered?—No, I am not.

1465. Have you heard such was the case?—No, I have not heard anything of that, but I should not be at all surprised that if a further attempt should be made it would succeed; the Pacha, with his revenue, can do anything, but for a private individual it would be too much to undertake.

1466. Have you been on the route between Keneh and Cosseir?—I have; I traversed it about 18 years ago.

1467. Do you know anything of the harbour?—It is a very indifferent harbour; the harbour of Cosseir is very small; I have been there in a ship of 400 tons, but it is not good anchorage when the wind blows from the east or north-east.

1468. You do not apprehend any difficulty in a steamer anchoring there or laying there for a short period?—No: they have been employed there several times: when Sir John Malcolm came, he touched there: I think it was the Hugh Lindsay, which afterwards came up to Suez. When Lord Clare embarked he went to the port of Cosseir, in, I think, the same steamer to Bombay.

1469. Assuming that to be the depôt, and a place of general embarkation, should you recommend that a steamer should stay at Cosseir on its way?—Just *en passant*, as they do at Malta; it would be very convenient, because there is no occasion to be detained more than a few hours, to put passengers on shore; it could be done without any loss of time: but at Suez there is very good anchorage for ships of 800 or 1,000 tons, and during the expedition under Sir David Baird, when the Indian army came to Egypt, they had East Indiamen of 1,000 tons there.

1470. Do you know anything of the Island of Camaran?—Nothing; I stopped at Mocha, when I went down the Red Sea myself, and passed by Camaran, but I had no knowledge of it then.

1471. Is it your opinion a regular passage to and fro of steam vessels would induce the Abyssinians to form a trade, which is known not to exist at present?—It might in progress of time, but the Abyssinians are constantly in a state of civil war with the Galla tribes, so that on that coast there is no safety; at the time Mr. Salt was there on a mission, I believe the country was much in the same state; they carry goods over to Mocha; and make a depôt there for the produce of that country.

1472. Do you not suppose that that commercial intercourse would increase?—Yes, that I firmly believe; if once there is security, and that a trade is commenced, I have no doubt that the trade with Abyssinia would increase, but if the country continues in a state of disturbance, there will always be insecurity.

The Honourable *John Elliott*, called in; and Examined.

Hon. *John Elliott*.

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1473. *Chairman.*] YOU belong to the civil service of Bengal?—I do.

1474. How long were you postmaster-general in Calcutta?—From 1829, I forget the month, to December 1835, I think.

1475. How are the public despatches and correspondences at present conveyed between England and Calcutta?—By sailing ships; entirely by sailing ships.

1476. A very small portion of that correspondence hitherto has come by the overland despatch?—A very small portion of it has come, certainly.

1477. How many days are required for the common post to pass between Calcutta and Bombay in the dry season and in the wet season?—The average to Bombay and from Bombay was 11 days and 11 hours, in March 1835; that is in dry weather, and in wet weather, in the month of March of the same year, taking an average rate from Bombay, was 11 days, 11 ¾ hours; but this mail was at that time detained several hours at Midnapore, on their way to Calcutta, and at Poonah, on their way to Bombay, which has since been remedied; this will shorten the time about 10 hours. In the wet season, on an average, I should say three days may be added, and in very inclement weather, when the rains are at their height, further delays are occasionally experienced; I have known them as much as two days more, I think.

1478. What was the cause of these delays?—The inundation of the country by the heavy fall of rain, and the filling of the rivers, rendering them even impassable.

1479. Are any of the packets yet lost?—I do not remember any packet having been entirely lost on that road; I have known packets lost for a time owing to the people being taken by tigers.

1480. Are they ever so damaged as not to be legible?—I do not remember an instance upon that road.

1481. Do you remember many instances of the post-runners being taken by tigers?—I think I remember as many as five men being killed upon that road at the time I was postmaster-general; I will not be certain whether there were four or five.

1482. Is there any main road between Calcutta and Bombay?—If by main road is meant a road for wheeled conveyance, there is nothing further than from Bombay to Poonah, that I am aware of, which is 93 miles.

1483. What is the duration of the dry and wet seasons?—The dry and wet seasons, so called in the Post-office, are from the 1st of July till the 1st of November, that is the wet season: and from the 1st of November to the last day of June is the dry season. The contract rates are different for those periods; the contractors contract for a different rate of travelling at the two periods of the year.

1484. In what mode are the dauks carried?—On that road they are during the dry weather carried by foot-runners from Calcutta to Ripore; the distance is 535 miles to Ripore: from thence to Omroirtie, which is the termination of the Bengal post-office jurisdiction, they are carried in the dry weather by horses, on horseback, and in the rainy season by men; I cannot tell the exact distance of that, but at a rough guess I should say it is upon an average 330 or 340 miles; now, from Omroirtie to Poonah, I believe, a contract has been made since I left India; it was commencing, in fact, when I left India; for the conveyance of the mails, in the same way as above; that is, by horses in dry weather, and by men in wet, and from Poonah to Bombay they are conveyed in a wheeled conveyance of some description, something like a gig I imagine.

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1485. Mr. *Mullins.*] At all seasons?—I believe at all seasons.

1486. *Chairman.*] What portion of this route is intersected by unhealthy jungle?—Nearly the whole way from Midnapore to Nagpore is through jungle, and a great part of which is unhealthy at most periods of the year; I cannot exactly define it more closely than that.

1487. The distance being about how many miles?—From Midnapore to Nagpore is about 600 miles, near 650 miles.

1488. Do you know of the intervention of any jungle on the Bombay side?—After leaving Nagpore, I believe there is a good deal of jungle between Nagpore and the Almabad, but I do not know the extent of it.

1489. Do you think passengers landing at Bombay could make this route overland to Calcutta?—Generally speaking, I should say, certainly not; healthy young men might do it at particular periods of the year, but females and children could never do it; and the strongest men can only do it occasionally, I should say at particular periods, under the present arrangement certainly.

1490. Is there any dauk conveyance of parcels established between Calcutta and Bombay?—There was one established just before I left the office, but I do not think it was quite complete, but there is one now I should imagine; at any rate, whether there is or not, it might always be put.

1491. How many days is banga in passing in the two seasons?- That had only just commenced when I came away.

1492. Mr. *Mullins.*] Can you form any opinion as to the period?—Yes, I can.

1493. *Chairman.*] What is the difference between the ordinary post and the banga between other stations, supposing the arrangements to be as well completed on one road as on the other?- The post from Calcutta to Meerut, a distance of 893 miles, travelled it in March 1835 in seven days and 20½ hours; the banga, in the month of April in the same year, was about 12 days; therefore, it is the difference between 12 days and seven days and 20½ hours; it is about a third more.

1494. At what rate do periodicals and parcels go by the dauk banga?—By the dauk banga the parcels go, and it does not signify whether they are periodicals or what they are, if they go in the banga they go by the weight.

1495. If persons in Bengal wish to embark to England by Bombay, what route would they be likely to proceed?— If they wish to embark in steamers?

1495*. Yes, by Bombay.—They would be compelled, I should imagine, to go round by sea from any part of Bengal.

1496. And do you know about what is the length of passage?—There is a table in this book which gives the probable length of passage all the year, but I never had anything to do with that department at all.

1497. I suppose you know when the monsoon is unfavourable?—It occupies a very much longer time than I should suppose it would occupy; 60 or 70 days in the most unfavourable periods of the year.

1498. In short, very few persons from Bengal would avail themselves of that communication?—In the most unfavourable periods of the year I should think very few.

1499. Also at other seasons?—At other seasons. I have known some few people go round that way to join the steamers in their present imperfect state, and therefore probably more might go if they were more perfect, but I cannot imagine it would become a general route at all.

1500. If a communication by steam vessels from England to Calcutta could be effected in about two months, do you think the great mass of correspondence would take that channel?—I certainly think that the greater portion of private correspondence would take that channel if it could be secured under that supposition.

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1501. Now, what rate of postage on single and double letters by that communication would you recommend so as to insure its general adoption?—I think the rate that was adopted by the Court of Directors a very fair rate; it is a very low rate, I think, and taking it as a matter for the accommodation of the public and not as a matter of revenue, I should say it is a very fair rate. I have made a memorandum of that rate from the order which came out at the time I was there. The Court's order of the 23d of February 1835, directed that letters weighing a quarter of an ounce were to be charged at half a rupee: that is the steam postage on the Bengal side, not of course the whole way to England. Letters weighing a quarter of an ounce, which are termed single letters, half a rupee: above a quarter, and not exceeding half an ounce, one rupee; half an ounce, and not exceeding three quarters, one rupee and a half; and three quarters of an ounce, and not exceeding an ounce, two rupees, and so on, a rupee being charged for every additional half ounce. Single newspapers, in covers open at the ends, to be charged the lowest rate, namely, half a rupee. The only objection to this arrangement was that it was made in ounces, which was a weight not known in the country; it was impossible to put it in force in the form in which it came, it was therefore converted into sicca weights as nearly that rate as possible.

1502. What proportion would you say of the whole correspondence would go by this route from Bengal, supposing it were secure for two months?—I should think more than half in number of letters, much more than half, but in point of weight, I should not think there would be perhaps quite half, because the heavy letters would be comparatively so heavily charged, that I do not think they would go by that route, and there must be always a number of letters go by sea, because they are connected either with persons or things going in the ships.

1503. Can you give any estimate of the probable return of the number of letters so sent?—I can give no account of the number: I have no recollection of it, and have no means of getting at it here.

1504. Mr. *Mullins.*] Is it your opinion that the number of letters at present calculated to be sent annually would be very greatly increased by the quicker communication between this country and India?—In my opinion, the more you can improve the communication the greater the number of letters there will be; in all post-offices improved communication is the first step towards increasing postage.

1505. *Chairman.*] I believe the posts throughout the province of the Bengal presidency were accelerated during the time you were postmaster-general?—They were.

1506. Have you any table to show in what degree they were accelerated?—This paper will show to what degree they have been accelerated on the principal roads from the presidency.

[*The Witness delivered in the same, which was read, as follows:*

(A.)

Hon. *John Elliott.*

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Memorandum showing the shortest Time hitherto occupied by any one Dauk between the following Places, in March, April and May 1835.

	HOURS OCCUPIED.				RATE OF TRAVELLING.		
			D.	H.	M.	F.	P.
Calcutta to Patnah - - - - -	78 hours occupied,	or	3	6	4	5	30
Calcutta to Benares - - - - -	82 —	or	3	10	5	1	3
Calcutta to Gorrockpore - - - -	99 —	or	4	3	5	1	38
Calcutta to Cawnpore - - - - -	126 —	or	5	5	4	7	19
Calcutta to Delhie - - - - -	173 —	or	7	5	5	1	0
Calcutta to Kurnaul - - - - -	188 —	or	7	20	5	1	18
Calcutta to Meerut						0	32 ¼
Calcutta to Lucknow - - - - -	122 —	or	5	2	5	0	10 ½
Calcutta to Jubbulpore - - - -	169 —	or	7	1	4	1	32 ¾
Calcutta to Berhampore - - - -	21 ½ —	or	0	21 ½	5	6	5 ¾
Calcutta to Bhaugulpore - - - -	49 —	or	2	1	5	5	2 ½
Calcutta to Dinagepore - - - -	48 —	or	2	0	5	3	20
Calcutta to Rungpore - - - - -	58 —	or	2	10	5	2	30
Calcutta to Dacca - - - - -	39 ½ —	or	1	15 ½	4	6	27
Calcutta to Chittagong - - - - -	73 —	or	3	1	4	5	14 ¼
Calcutta to Midnapore - - -							
Calcutta to Sumbulpore	84 —	or	3	12	4	1	5 ¼
Calcutta to Nagpore	146 —	or	6		4	7	11 ½
Calcutta to Aurungabad	209 —	—	8	17	4	7	20
Calcutta to Bombay	267 —	or	11	3	4	6	10 ½
Calcutta to Balasore - - - - -	25 —	or	1	1	5	2	35
Calcutta to Cuttack - - - - -	40 ½ —	or	1	16 ½	5	7	24
Calcutta to Gangam	70 —	or	2	22	4	7	36 ½
Calcutta to Madras	240 —	or	10	0	4	3	8 ¼

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1507. Mr. *Mullins.*] Is it your opinion that the number of passengers between this country and India will be materially increased by the establishment of a communication by the Mediterranean?—That is a sort of opinion which is perfectly applicable to all other countries; we know whenever additional facility is given there is an increased number of passengers, and that no doubt would operate towards India as it would towards all other countries; many people are now deterred by the very great inconvenience and the very great length of passage and the sufferings of a long voyage, and no doubt the number would be increased if they could make them in an easier and more comfortable manner.

1508. You think the increased comforts that such passengers would be likely to have in a steam vessel would induce them to pay a larger sum for their passage than they have been previously in the habit of doing by the Cape?—I do not know whether that would operate very largely; I think if it were a much higher rate it would operate very much to check the people from going by it.

1509. Taking the passage money by the shorter route to be 150*l.*, while that by the Cape is 120*l.*, do you suppose that the greater advantages on the one route or the other would encourage them to give the larger sum and still create an increase of passengers?—No; I do not think it would operate very materially to decrease the number of passengers, that increase of rate.

1510. Have you considered the question of passage money?—I have not, more than having to pay a good deal of it in the course of my life.

1511. Do you think that the rate charged by the Cape of Good Hope would be a fair rate to charge on the shorter passage by steam vessels?—Upon my word I am totally incapable of forming an opinion upon that; I do not know upon what ground you regulate the thing at all.

1512. When did you leave India?—On the 10th January 1836.

1513. At that period what were the ordinary rates of passage money by the Cape of Good Hope?—That varies so entirely with the cabins, that I cannot say.

1514. *Chairman.*] State from the highest to the lowest?—I ought to be able to tell, but I really am afraid I cannot; they vary very much in different ships; they vary most exceedingly in different ships; the larger class ships charge twice as much as the smaller class ships, and they vary again very much by the reputation of the captains, and so on, that I cannot say.

1515. Mr. *Mullins.*] In your estimate of letters have you taken into consideration any increase of correspondence likely to arise from the greater facilities of communication?—What estimate of letters?

1516. The estimate that you have just given in your answer?—I was asked what proportion I thought would go; it does not signify if there are a lac of letters or 10 lacs; I supposed that half would perhaps go in that way.

1517. Are you aware of the rates of postage as specified in the proposed new arrangement?—Yes, I am; they are similar to the ones I before enumerated.

1518. Is it your opinion that a land communication between Bombay and Calcutta or Bombay and Madras could be made safely for the conveyance of passengers generally?—I do not think in the present state of the country it could; certainly not for passengers generally,

1519. You therefore think it would be an advantage of great importance that there should be a communication established between the different ports or presidencies of India, so that passengers should not have to pass by land and suffer that inconvenience which they do at present?—I think it would be a very great individual accommodation, a very great accommodation to the public generally in the way of getting from one country to the other.

1520. I think you stated, in an answer to a former question, that accidents have sometimes occurred to the mails in their conveyance?—Yes.

1521. Do you know whether that has been the case on many occasions?—With regard to the tigers, I stated before I had known four or five men killed by the tigers.

1522. With regard to accidents occurring from other causes, in rains are you not aware that the mails have been sometimes seriously damaged?—I do not think more so than on other roads; I really do not think over the whole country, the last rains I was there, there were half a dozen wet wallets.

Dr. *Dionysius Lardner,* called in; and Examined.

Dr. *D. Lardner.*

6 July 1837.

1523. Mr. *Mullins.*] I BELIEVE you have devoted yourself to scientific pursuits for many years, and particularly to those branches connected with steam?—Yes, I have been a good deal employed in that way.

1524. You have considered also the question of steam communication with India in its various bearings?—Yes; I have been a good deal engaged in the consideration of it, first, as a subject of general statistical and mechanical inquiry, and I was subsequently expressly engaged in it by persons who are interested in having the question sifted in all its bearings, at whose suggestion and by whose wish this pamphlet has been prepared [*producing a pamphlet*].

1525. You have, in this pamphlet of yours, given your opinion as to the number and the sizes, the tonnage and steam power of the vessels, that should be employed between Alexandria and India?—Yes.

1526. Perhaps you will have the goodness to repeat that opinion, in order that we may have the advantage of it in evidence?—I take it that to establish a line of communication between Egypt and India, which could be carried on with certainty and regularity, and which would meet the difficulties which necessarily must arise from the distance, from the absence of mechanical skill, and from the peculiar physical and geographical circumstances connected with the route, such as the monsoons, they ought to be vessels of the most efficient and powerful description; and I have therefore proceeded upon the supposition, that mere economy as to expense was a matter altogether of secondary consideration; with those views, I would recommend vessels of about 1,000 tons burthen and 250-horse power, and that the whole establishment on the eastern side of Egypt be of one perfectly uniform character, every vessel to be a counterpart of the others, so that every spar, and every part of the vessel, both nautical and mechanical, could be interchanged one vessel for another; the vessels, in fact, should be exact duplicates of each other. Then I would recommend the voyage to be divided into stages, and each stage to be worked by a separate vessel. For reasons that it would be very easy to explain, connected with the nature of the application of steam to nautical purposes, it is found that steam-engines applied to navigation require to be cleaned, adjusted and examined at moderate intervals of time; if you do not do so the engine will not continue to work with advantage; it will get lamed, crippled and inefficient; that is one circumstance which puts a limit to the length of the stages of the steamers; another is this, that if your stage be long you must carry so enormous a quantity of fuel that all the valuable tonnage of your vessel will be occupied in that way; for these, and many other reasons, which perhaps it would be tedious to detail to the Committee, connected with the mechanical part of the vessel, after all the consideration I have been able to give it, I should recommend the voyage from Calcutta as a starting point to be resolved into stages in this manner: the first vessel leaving Calcutta, and touching at Madras, would go to Point de Galle, or whatever harbour might be selected in Ceylon; Point de Galle is the best; then that vessel should stop, and the passengers and the despatches, and whatever cargo there might be, should be transferred to another vessel; that vessel would go to Socotra; and I would advise a station of refuge to be established at the head of the Maldives; then another vessel should communicate between Socotra and Bombay, so that that steamer would meet the Ceylon steamer at Socotra, Socotra being a common rendezvous. Then between Socotra and Suez it might be advisable to have an intermediate station; and the best, as far as I have been able to ascertain, which can be selected, all circumstances considered, would be the island of Camaran. This occupies a position very nearly midway between Socotra and Suez, and it has what, in my opinion, is an advantage of very great moment indeed: it is insular, and it is furnished with one of the very best harbours in the Red Sea. The harbour lies on the inner side of the island, next the main land; you can approach it in ships of almost any burthen; there is no bar nor obstruction across the strait or passage to prevent you, and ships of any magnitude that can be wanted will lie within three or four yards of the shore. Then from Camaran to Suez is a practicable distance, of about 1,000 miles, touching at Cosseir; thus the steamer that leaves Socotra I would have stop at Camaran, and I would have another steamer plying between Camaran and Suez, so that there would be separate steamers for each station; that is five distinct lines or runs of separate steamers.

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[*Paper delivered in by Witness.*]

(A.)

		Distance.	* Coal.	Time.
		Miles.	*Tons.*	*Days.*
FIRST STEAMER:	Calcutta to Madras	765	88	4
	Madras to Ceylon	530	62	3
SECOND STEAMER:	Ceylon to Socotra	1,660	192	8 ½
THIRD STEAMER: (Bombay Branch)	Bombay to Socotra	1,210	140	6
FOURTH STEAMER:	Socotra to Camaran	790	92	4
FIFTH STEAMER:	Camaran to Suez	1,065	124	6
Delay at the Stations		—		5
Time from Calcutta to Suez		—	—	30 ½
— Madras to Suez		—	—	25 ½
— Bombay to Suez		—	—	19
— Ceylon to Suez		—	—	21 ½

The above are what may be considered as the probable average times of the trips, except during the south-west monsoon, when the homeward trips will be longer and the outward shorter.

1527. *Chairman.*] How many would you have for each station?—One would be sufficient for the regular work; there would be an abundance of rest for each.

1528. What would be the total establishment of steamers for those different stages?—I should think that six or seven would be an abundance; for the whole of the eastern side five would keep up regular work, and then you would have one or two spare steamers; I mean that for the regular work, from month to month, one steamer would be sufficient for each stage, but in the event of accidents you should have a spare one or two to take the place of any of those that were damaged; not that even that would be necessary, if it were thought a matter of great economy; for example, suppose that the steamer between Camaran and Suez met with an accident the steamer from Socotra could go on to Suez; still it would be prudent to have one or two spare vessels to lay on when occasion might require.

1529. Mr. *Mullins.*] You are aware that great impediments are presented in a direct passage from Bombay to Socotra in certain months of the year?—Yes.

1530. Then, looking to the impediments so offering themselves at certain periods of the year, is it your opinion that a vessel of the size you have already stated would be the best to cope with the monsoon?—Decidedly; it is the physical impediment of the south-west monsoon which mainly induces me to recommend vessels of that large tonnage and power.

1531. It has been already stated in evidence, that vessels of about 650 tons, with a proportionate horse power, would be considered quite powerful enough for any obstruction that might arise from the south-west monsoon, and would answer every purpose that a larger vessel could be expected to answer. Why is it that you suppose that a vessel so much larger would be superior in many respects to the smaller ones?—Because from the experience I have had already of steam vessels, I have found that those vessels of inferior tonnage are not equal to the larger vessels. I can show the Committee the result of an examination I have made of a number of vessels, chiefly Government steamers, and I find that the smaller vessels, although they are equally well constructed in their machinery, and have no defect about them that I can discover, but merely their small size, are not able to cope with adverse weather in any degree approaching to the larger class.

1532. Do you speak now of such vessels as the Atalanta and Berenice, which have been already fitted for that station?—I do; I have had the experience of several vessels quite equal to them, and I should say perhaps even in some respects superior to them in details; I have examined with great care the performances of nine of the Government steamers, differing from each other in various particulars, and I find that the most efficient of these is the Medea, a steamer of 800 tons burthen and 220-horse power. Now, I have examined these

with

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with very great care, and, if the Committee will allow me, I will put in the result of the inquiry I have made. The way I have considered the question is this: the efficiency of a steamer is best determined by the actual quantity of coal per horse power which she will consume in going over a given distance; I do not care about the time; it is a matter of no importance whether she goes fast or slow; the question is, how much coals will carry her 1,000 miles, or how many thousand miles a given weight of coals will carry her; that I call the *locomotive duty*; I have found it so useful, that like every notion introduced into general inquiry, you must have a name for it, and I have called it the *locomotive duty* of coals; by the locomotive duty then, I wish to be understood to mean the number of miles over which one ton of coals per horse power is capable of transporting a vessel. I have examined the performances of a number of these vessels, which I will now put in.

[*The same was put in and read, and is as follows:*]

(B.)

NAME.	Tonnage.	Length.		Breadth.		Power.	Diameter of Cylinder.	Length of Stroke.		Construction of Wheels.	Diameter of Wheels.	
		Ft.	*in.*	*Ft.*	*in.*		*Inches.*	*Ft.*	*in.*		*Ft.*	*in.*
African - - -	246	110	0	24	11	90	38	3	6	common -	13	6
Blazer - - -	410	145	0	28	5	100	44 ¼	3	6	feathering -	17	4
Confiance - - -	246	111	0	24	10	100	40 ¼	4	0	- ditto -	18	0
Dee - - -	639	166	0	30	4	200	53 ⅜	5	6	common -	20	0
Firefly - - -	473	155	0	27	9	140	44 ½	4	6	- ditto -	18	6
Flamer - - -	414	155	0	26	5	120	42	4	0	feathering -	17	4
Medea - - -	807	179	0	31	11	220	55 ½	5	0	- ditto -	24	6
Pluto - - -	295	135	0	24	2	100	39 ½	3	6	- ditto -	16	6
Tartarus - - -	410	145	0	28	5	100	39 ½	3	6	- ditto -	17	8
Dolphin - - -	340	-		-	-	160	48 ½	4	6	common -	18	10
Pr. Steamer (A) -	660	-	-	-	-	220	56	5	0	- ditto -	22	0

NAME.	Miles.	Hours.	Pounds.	Power.	Rate.	Lbs. per horse power per hour.	Locomotive Duty, Miles.	Observations.
African - -	19,996	3,894	3,834,544	90	5.13	10.94	1.054	Government Mediterranean steamers.
Blazer - -	10,340	1,645	1,693,020	100	6.28	10.2	1.500	
Confiance -	14,130	2,279	2,261,196	100	6.20	9.9	1.389	
Firefly - -	14,180	2,206	3,110,688	140	6.246	10.7	1.308	
Medea - -	9,240	1,176	2,153,508	220	7.8	8.3	2.105	
Pluto - -	6,360	986	954,240	100	6.45	9.67	1.501	
Tartarus - -	5,060	914	976,500	100	5.55	10.68	1.151	
Dee - -	7,539	1,161	1,933,092	200	6.49	8.3	1.754	Government West Indian steamers.
Flamer - -	4,697	780	1,000,272	120	6.0	10.7	1.256	
Dolphin - -	55,750	- -	- -	- -	9 ¾	12.0	1.820	Post-office steamer.
	22,400	- -	- -	- -	7.7	12.5	1.379	Scotch steamer.

The result of these inquiries is a very distinct and decided opinion indeed in favour of vessels of large tonnage with a certain proportion of power. I should observe, it is not merely these results, but a good deal of other information, which I could not very well reduce to a numerical form, but of a general kind, obtained from the performance of the Scottish steamers, and of commercial steamers in various other parts of our channels, and the invariable result of all these inquiries and all this information converges to the one point, to favour vessels of large tonnage, with a proportion of about one to four of their horse power of their tonnage.

1533. *Chairman.*] It has been already stated that the proportion of one to

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three was the proper proportion; why do you prefer one to four?—The proportion of power to tonnage must be entirely determined by the voyage which the vessel has to perform without a relay of coals. In short trips the best proportion is that of one to two. One of the most efficient steam ships which has ever been constructed is one which has recently been placed upon the station between London and Hull, which is a vessel of 800 tons burthen, and 400-horse power. Another instance of the same proportion used with success is the Post-office steamer called the Dolphin, which has attained a greater average speed than any other steamer with which I am acquainted.

1534. Mr. *Mullins.*] State between what places she plies?—Dublin and Holyhead. But it is obvious that if a long trip be contemplated, of the spare tonnage of the vessel a larger portion must be given to the fuel and a lesser portion to the machinery, consequently the proportion of the power to the tonnage must be less than in shorter trips. The proportion may vary from one to two, or say from one horse to two tons, to from one horse to five tons, according to the length of the trip. The state of weather to be encountered is also in some cases to be considered: when very adverse weather, such as the south-west monsoon or the westerly gales of the Atlantic are to be encountered, we cannot prudently venture a very small proportion of power, and I would not under such circumstances ever advise a less proportion of power than one horse to four tons.

1535. Is it your opinion that that would be the best proportion that could be adopted under such circumstances?—I am distinctly of that opinion.

1536. *Chairman.*] You are of opinion that that proportion would be sufficient?—Amply.

1537. Mr. *Mullins.*] Do you take into consideration the vessel making headway going directly against the wind in the south-west monsoon?—No; a steam ship never would do it; a steam ship should tack just like a sailing vessel, taking wind on her beam, and steal along in that way, and take advantage of the lulls. The south-west monsoon, as his Lordship is aware, is not a wind that blows everlastingly with unabating and unaltering force; it is liable to lulls, and to variations of intensity. In the south-west monsoon, when most violent, the vessel would lie-to, and when it mitigates she would tack more or less, according to the force of the wind, and during the lull would go with her head fair for her course, and would get on in that way. But, putting profit and expediency and everything of that sort out of the question, as to the mere abstract practicability of a steam ship such as I have described making Socotra from Bombay in the south-west monsoon, I would put it in this way: I have ascertained by the calculations which I have put in, that a vessel of the kind I have described is capable of being transported 2,100 miles by a ton of coals per horse power in average weather. It is easily shown that a vessel of that kind, allowing a fair proportion of space for passengers and everything else, is capable of carrying a ton and a half of coals for each horse power; consequently, she is able to carry coals that would propel her, in average weather, 3,000 miles, or 3,200 miles; she starts, then, from Bombay with power in her, under average circumstances, sufficient for 3,200 miles, with 1,200 miles before her. If, therefore, the adverse circumstances of the monsoon be admitted to be such as to obstruct her, compared with average weather, in the proportion of 32 to 12, she still has that in her which will enable her to reach Socotra.

But another expedient presents itself: let us suppose—though I do not admit it—but let us suppose that it was found, after a fair trial, inexpedient to make the passage direct from Bombay to Socotra against the monsoon, still this could be accomplished; the steamer could make the head of the Maldives from Bombay; *that* she could do most unquestionably; the distance is quite within what I have proved steamers to be capable of; she would be sufficiently oblique to the monsoon to do it. At the Maldives she would meet the Ceylon steamer, and from the Maldives the monsoon would not be so directly against the vessel that she might not go to Socotra. Or she might go from Bombay to Point de Galle during the monsoon; there would be no difficulty in that; and then starting from Point de Galle there would be no difficulty in making Socotra during the south-west monsoon, because they have only to go a little south and they can soon convert the monsoon into a favourable wind; they could in this manner go a great part of the trip without steam at all.

1538. Assuming

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1538. Assuming a vessel leaving Bombay for Socotra to make her southings and tacks in the way you mentioned, at what rate do you estimate her progress in average weather?—Such a vessel as I describe will, in average weather, fully accomplish eight knots an hour, and I suppose that under such circumstances it would not be too much to say that that would be reduced to something under five; five would not be an unfair estimate, or four and a half against the monsoon.

1539. Against the south-west monsoon?—Yes, four and a half.

Veneris, 7° die Julii, 1837.

MEMBERS PRESENT.

Lord William Bentinck.	Mr. Mullins.
Mr. Gordon.	Mr. Young.
Mr. Hutt.	

LORD WILLIAM BENTINCK, IN THE CHAIR.

Dr. *Dionysius Lardner*, called in; and further Examined.

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1540. Dr. *Lardner.*] I WISH to explain more explicitly a question of some importance that was put to me yesterday, as to the best proportion between the power and the tonnage of steamers. The best proportion between the power and the tonnage of steam ships will depend altogether on the length of the voyage; the space devoted to the propelling power is necessarily limited, and is distributed between the machinery and the fuel. The more powerful the machinery the better. But as there must be fuel to carry the vessel through her whole trip, the space occupied by the machinery will be proportionally limited. Therefore, the longer the voyage the less proportion must the power of the machinery bear to the tonnage of the vessel. If physical obstacles, such as the monsoon in the eastern seas, or the western gales of the Atlantic, are to be encountered, there must, on the other hand, be power sufficient to enable the vessel to make way against them. Therefore, we are on the one hand limited in power by the length of the voyage, and on the other hand we are compelled to provide power sufficient to encounter those obstacles. In the shortest class of trips, such as the Channel trips, round these coasts, a proportion of one to two is the best. In the longer class of trips, such as trips extending from 600 to 1,000 miles, a power of one to three may be used, and in the longest class of ocean voyages, such as those between India and the Red Sea, or between Europe and America, the proportion should be one to four, or one to five, in order to leave sufficient room in the vessel for the fuel necessary to propel her through her whole trip.

1541. *Chairman.*] How far would the speed be affected by these proportions?—The speed would be affected by them of course; the more powerful the machinery is, or to speak more correctly, the greater proportion the power bears to the tonnage, the greater will be the speed, but the consumption of fuel will be nearly the same, that is to say, a ton of coals will carry the vessel nearly the same distance, whether you have very powerful machinery or machinery of less power. The difference will merely be that the ton of coals carries her faster in the one case and slower in the other.

1542. I wish to know the degrees of speed of these different proportions?—I can give it the Committee approximately.

1543. Let us suppose a 1,000 ton vessel?—A 1,000 ton vessel provided with engines 500-horse power, which would be what I would adopt for a vessel between this and Hull, constructed with the very best machinery, and the best possible model, would, I dare say, go above 10 knots an hour.

1544. Let us take it at 800 and 400?—That vessel, in average weather, will certainly accomplish from 10 to 10 ½ knots an hour; but reduce that to 800 tons burthen, and 250-horse power, the speed will probably be reduced to eight or eight and a half knots, and reduce it then to 200-horse power, from seven and a half to eight knots. That is the lowest. A vessel with one-horse power to four tons you may reckon in average weather doing very nearly eight knots.

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knots. It is better, however, to give the fact upon which that may be proved; the Medea, which is the vessel I mentioned to your Lordship yesterday, is a vessel of 800 tons burthen and 220-horse power; she is fitted with excellent machinery, and is a beautiful model, and I have taken the performance of that vessel for nearly 10,000 miles, and her average rate for 10,000 miles was seven knots and eight-tenths.

1545. Do you know what was the maximum and minimum of her speed?—I do not bear it in recollection now, but I could tell by reference to my papers.

1546. Mr. *Mullins.*] Have you any further remarks to make on the subject you were upon?—I do not recollect that I have.

1547. The Committee are anxious to ascertain more fully why it is that you prefer a vessel of 1,000 tons, and a proportionate horse power, to vessels of the size of the Atalanta, or the Berenice?—From an extensive examination of the performance of steamers of various amounts of tonnage and power, I have found invariably that the vessels of the larger tonnage are more efficient in rough weather than the smaller vessels; and that that efficiency which they have in rough weather affects their average performance in a very sensible degree.

1548. Taking a vessel of the size of the Atalanta or the Berenice, which is from 600 to 660 tons, and a horse power of from 200 to 230 tons, how many tons will there be for the conveyance of a cargo in such a vessel, over and above the necessary supply of fuel which such a vessel should take for so long a voyage as one between Point de Galle and Socotra, in the south-west monsoon?—I do not think that vessel could carry any cargo at all, supposing her to steam it the entire way in the south-west monsoon; such a vessel as you have described, taking her from Point de Galle; a vessel so small as that, with such a large proportion of power.

1549. Is that your decided opinion, after the consideration that you have given to the comparative powers of steam vessels?—Yes, that is my decided opinion; it is not a vessel that I would recommend to be used. I think that vessel would consume more coals in proportion to her power and tonnage than a vessel of a proper tonnage would do, and she would be more inefficient, she would make less way, and she would be less useful, both for passengers and cargo.

1550. Then if such is your opinion as to the passage between Point de Galle and Socotra, it must be still stronger in the case of the passage between Bombay and Socotra?—Between Bombay and Socotra my opinion is, that that vessel, in most cases of the monsoon, could not go at all, could not make the direct passage steaming.

1551. Not if she were to tack or to make southings?—Then she would be converted, in fact, into a sailing vessel; if she were to carry that to any very great extent, she would do what a sailing vessel would do; she would run down the coast towards the Maldives until she would get the monsoon on her beam, and then she would make Socotra; she would be struggling against her own deficiency.

1552. So that your opinion is, that under such circumstances a steamer of that size would have no advantage over a sailing vessel?—A steamer of that size would not, in my opinion, have any great advantage over a sailing vessel under the circumstance of the monsoon.

1553. But if you take a vessel of the tonnage of from 800 to 1,000 tons, with proportionate power, it is your opinion that she is capable, under all circumstances, of effecting such a passage?—I think she would be capable under all circumstances. I believe I stated yesterday that there are states of the monsoon in which the vessel would be compelled to lie-to, she could not make way at all. There are other states of the monsoon in which she would run perhaps within six points of the wind, at others within three or four points of the wind, and then during the lulls she would make direct way. Now in proportion as you render a vessel less efficient by diminishing her amount of tonnage, you will limit her power of availing herself of these different means of encountering the physical difficulty, and you will cripple her and bring her down more and more to the level of a sailing vessel. There is an impression, that by giving the vessel a greater proportion of power than what I have stated, you can force her against a strong head wind, and perhaps that might influence persons who fix upon that proportion of 660 tons, and 230-horse power; but it is found that you cannot do that. That if you had an unlimited power, and were to force her against the wind, she would thrust her head under the water, she would bury herself; you cannot in such cases avail yourself of the power; power becomes useless beyond a certain point. My decided opinion is, that one-fourth of her tonnage in power is as much power as can be usefully employed against the weather that you will encounter, quite as much.

1554. *Chairman.*] How do you reconcile that with the answer you gave to a former question, that one to two was the proper proportion?—Very easily. The cases where one to two is adopted is in short passages, where they are of course liable occasionally to weather like that; as for instance, between Dublin and Liverpool, that is the proportion of power that the best vessels adopt. Now every one is aware that the westerly gales to which that passage is subject are equal to, or exceed indeed, any monsoon occasionally. But in going against these they do not exert their full power; it is possible for them to have the power, but not to use it. The time they use their power is when the weather is in an ordinary and moderate state; they will then go on at the rate of from 10 to 11 knots an hour; but I have been in vessels on that passage when they did not make three miles an hour; the power in such a case becomes useless; they work the engine under its power; ease the engines, as they call it.

1555. She would be otherwise buried under the waves?—She would bury herself decidedly.

1556. Mr. *Mullins.*] But assuming the south-west monsoon to prevail for only a limited period, then should you, in the application of power to the vessel, think it advisable to look more to the prevalence of that south-west monsoon for a certain period of the year, than to the advantage you would gain from having an increased power during the other periods of the year?—I do not conceive that you would gain any material advantage, considering the length of the trips, by any increase of power that you could get beyond what I have stated, because the trip between Point de Galle and Socotra is one in which, under almost any circumstances, you could not profitably use more; you would require to have a proportion of power not exceeding what I have stated, even supposing the monsoon was not in question. The monsoon would not alter my estimate of the proportion of power to tonnage.

1557. Then, taking a vessel of the size you propose, with the proportion of power of one to four, what number of tons should you think would be spared for the cargo, over and above the quantity of fuel necessary to be taken for the longest stage?—I will take if you please the longest stage, from Point de Galle to Socotra, that distance is about 1,600 geographical miles; now a ton of coal per horse power, putting the monsoon out of the question, will carry the vessel about 2,200 miles, therefore about three quarters of a ton will carry the vessel between Point de Galle and Socotra. The vessel has 250-horse power, therefore it will take about 180 tons of coal for actual consumption in the distance; but you must allow for contingencies, and therefore you might add, say 10 per cent. for these, which would make 200 tons. The vessel, therefore, will be thus circumstanced: her machinery, 250-horse power, will occupy the tonnage of 250 tons, you have coals 200 tons, which may be taken in tonnage as ton for ton, a ton of coals occupying a ton of tonnage, and that will be 450 tons that will be occupied by the propelling power. The vessel measures 1,000, and therefore there would remain 550 tons of unoccupied space for all the rest; viz. the crew, stores, passengers and cargo. Now that will afford ample accommodation for about 100 first-class passengers, and afford a very considerable space for cargo, which is not of a very heavy description. It is a great mistake to suppose that you can, if you wished it, so fill a vessel with coals that she can hold nothing more, that she shall have no spare space; the fact is, that never can happen, and any one who says so, is ignorant of the real nature of the question. The limit which is imposed to the supplying coals to a steam ship, is not a limit of space, it is a limit of immersion; you can put in coals until the vessel gets such an immersion that the paddle-wheels will not work, you must stop as soon as the paddle-wheel gets immersed to the depth of about her lowest paddle, and after you have put all that quantity of coals in her, you have a vast quantity of space besides what passengers will occupy, a space that passengers cannot occupy, a space in the lower parts of the vessel, and in many parts where you would stow goods, which must not be of a very heavy description.

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tion. Every trip you would have a spare tonnage for light cargo; but heavy goods, such as quicksilver, would be objectionable, because if they sunk the vessel too deep, they could not manage it; but for any cargo of a light description, however bulky it might be, you would have a very considerable quantity of space.

1558. Can you form an idea as to the probable number of tons that might be spared for such a purpose, without too great an immersion of the vessel from the cause you allude to?—You see from the calculation I have given in, supposing that the measured tonnage of the vessel is its real tonnage, and it ought to be so, then there would be 550 tons for every thing, and the disposition of these would mainly depend on what you calculated would be most advantageous to appropriate to passengers and what for cargo.

1559. But with regard to the tons weight, can you give any opinion as to the number of tons that can be made available?—That ought to be very limited, because you must not immerse the paddles; and here I would beg to state, that in those vessels that have long trips to encounter, I would recommend that the coal-boxes should be tanked, and that the trim of the vessel should be maintained by replacing the coals by sea water.

1560. *Chairman.*] Would not that add to the weight at other times?—No, the weight would remain the same. You may charge the vessel with a certain quantity of coals, in proportion to the trip she has to encounter, and the vessel will go better by having her paddles properly immersed, than if they were less immersed.

1561. Mr. *Mullins.*] You have not yet stated what the number of tons weight would be, that you think a vessel taking the proportion of coals I have just stated, would be able to carry without too great immersion?—That would be matter of calculation, depending a great deal on the model and build of the vessel; you must not immerse the vessel deeper than her lowest paddle.

1562. What would be the comparative annual expense of a steam ship, such as you recommend, of 1,000 tons capacity and 250-horse power, and one of 660 tons and 230-horse power?—The power being very nearly the same, there would not be any difference worth consideration, either in the original cost or expense of maintaining the machinery. The establishment of engineers, stokers, and cost of everything connected with the mechanism of the vessel, would be the same; the annual consumption of fuel would be about eight per cent less; the establishment of the officers and crew would be the same; the establishment at the several stations and depôts would be the same; but in the smaller vessel the space which could be appropriated to passengers would be greatly lessened, and none would remain for cargo.

1563. What would be the sailing expense of the two on a voyage of 1,200 miles?—That will be matter of calculation; but if the Committee will permit me, I will give in a statement of it.

[*The Witness was requested to do so.*]

1564. What would be the difference of time in making the voyage?—I am sure that the larger vessel would do it in less average time; but in smooth water the smaller and more powerful vessel would be the fastest, *cæteris paribus.*

1565. Mr. *Mullins.*] Is it your opinion that the employment of large vessels would produce other advantages besides those you have enumerated; would not larger vessels create a greater facility of communication by obviating the necessity of taking in supplies of coal so frequently as in smaller vessels, and also the necessity of cleaning the boilers so frequently?—No, I think the boilers must be cleaned as frequently in the one as in the other; I do not see much advantage in that. The main advantages of the large class of vessels will be these: that they will be most efficient in rough weather, and therefore their average time affected by the rough weather will always be less; their passages will be more certain; they will accommodate a greater proportional quantity of passengers and cargo; the expense for the work they do will be considerably less; that if the intercourse be increased, as from increased facility we always find it is gradually increased, you have the means to meet that; but if you start with small vessels, and you suddenly find the number of passengers or goods, or whatever it may be, to increase upon you, you have no means of accommodating them, except by multiplying your vessels; and it is obvious that to do a given quantity of traffic by a greater number of smaller vessels is far more expensive than to do the same quantity of traffic by a smaller number of greater vessels.

1566. Have you considered the fitness of the harbours of the Red Sea and Socotra?—Yes, I have very carefully examined those.

1567. You are aware that there are different harbours which have been recommended?—I am. It has been erroneously stated that the Red Sea is ill provided with harbours, in which steamers could lie on either coast: now here is an admirable chart, which has been made within a few years under the direction of the India Company, of the Red Sea, from the Straits of Babelmandel to Suez, and any person conversant with these things, who will take the trouble of examining it, will find that there is ample choice of places on either side, either for permanent stations or for places of refuge. Now here is the place which I have recommended as the intermediate station between Socotra and Suez; this is the Island of Camaran; the harbour lies inside here, and I understand it has been stated that a bar exists here; there is no such thing.

1568. Just state why you should recommend Camaran to any other station? —First, because it is insular; which is, I think, very important. The station there, the depôt, the coals, and everything that is necessary for the supply of the vessels, will be safe from the incursions of wild tribes that would infest any place on the main land, and it will be free from all causes of delay. When the Hugh Lindsay made her voyages, independent of any disturbance from the Arabs, they experienced very great delay from the local authorities; vexatious difficulties were thrown in their way about getting fuel and things of that sort, which would almost inevitably be the case if you had not a place under your own complete control. If then you had the Island of Camaran, and a hulk established there, containing the coals ready to supply the vessels, the steamers would come alongside the hulk, would take in her coals at once; the upper deck of the hulk might be fitted up as a workshop, with all tools necessary for the repair of the machinery, and with abundance of duplicates of those parts most likely to be deranged; such as parts of the paddle wheels and other things, so that when the vessel comes there she would be put to rights and receive her coals without any disturbance or delay. In the same way I would place one or more hulks of the same kind at Suez, with the same view, and at Socotra. The only disadvantage imputed to Socotra is the want of well-sheltered harbours; but there are two there, one of which is sheltered and safe in the north-east, and the other in the south-west monsoon, at different ends of the island.

1569. *Chairman.*] You have seen a statement of the present number of passengers that pass between England and India?—Yes; about 3,200 a-year.

1570. Do you think that that number will be increased by the establishment of a regular steam communication?—I have not the least doubt of it, and the ground on which I entertain no doubt of it is this, that in the history of human civilization, I do not believe there is one statistical law so free from exception as this, that in every instance where improved means of communication between centres of populations have been effected, whether the improvements consist in increased expedition or in increased economy, it has been invariably followed by a very large increase of intercourse; numerous examples may be given of this, though not of course applicable to distances so considerable as the present. In all the cases where we have seen railroads established, without a single exception, the intercourse has increased in an immense proportion. In some cases the increased economy has, no doubt, operated to a certain extent where the fare has been reduced one half, and the time has been diminished one half; there the increase has gone on in a four-fold or five-fold proportion. In the case between Liverpool and Manchester, where there were 400 persons per day before the railroad was established, there are now 1,600 per day. But as an instance where increased expedition only takes effect without diminished price, I may mention to you other railroads where the price has been actually increased; the price by the road before was less than it now is by the railroad, and notwithstanding that the road is deserted, and the railroad is used exclusively, the intercourse has increased in more than a four-fold proportion. Other instances might be mentioned, and very numerous ones, and upon all these grounds I entertain not the least doubt whatever, that if the line of steam communication be established between India

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and England, and that the time be reduced, as I am sure it may be, under two months between the Eastern presidencies and about six weeks between Bombay and England, I have no doubt at all that the intercourse will be increased in an immense proportion.

1571. Perhaps the case most analogous to that of India is Spain, where there is no great commercial or manufacturing population, where the natives are not habitually travellers; do you happen to know whether the intercourse has increased very much since the steam-boats have been established with the Peninsula?—Immensely, not only between Spain but between every part on the coast of Europe.

1572. Do you know in what proportion the intercourse has increased since the establishment of the Peninsula Steam Navigation Company?—I cannot give you an exact proportion, but I can take on me to say it has increased in more than a ten-fold proportion.

1573. What do you mean by ten-fold?—More than 10 times the number of persons go, and in some cases considerably more. I will give you an instance of a case where by the diminished price, independent of the increased expedition, an enormously increased intercourse took place. Last year there had been running between London and Boulogne steamers, the fare being I think a guinea and a half a head, and they had been for a considerable time plying in that way. There was an opposition established between two lines of steamers, and in order to ruin each other as they thought, they determined on reducing the fares to almost nothing, and they reduced them to 5 *s.* each line. The consequence was, that it was not a very uncommon thing for 800 and 1,000 persons a day to be landed at Boulogne. The steamers which began this opposition as a ruinous thing, with the intention of cutting each others throats, have continued it ever since as a source of profit, and they are still now 5 *s.* a head. It shows how little we know of statistical laws.

1574. Mr. *Mullins.*] Then it is your opinion that not only will there be an increased intercourse between this country and India, but that the far greater proportion of those who go from this country to India will avail themselves of the shorter route by the Red Sea in place of the present one?—I am convinced every one will go by it, and I feel assured that the fare may be reduced considerably below what they now contemplate, with profit.

1575. Have you considered that subject in reference to the fare that ought to be charged, making a due return to those persons who undertake the providing of the passengers?—Yes.

1576. Taking the whole fare between Calcutta and London at what you have stated it, what would be the proportional fares for the successive stages of the voyage?—I take for granted that no one would stop at Socotra. Some few trading with Arabia, might disembark at Camaran, or be dropped at other points on the coast. Short fares should of course be higher in proportion than long ones. If the whole fare from Calcutta to London be taken at 120 *l.*, the following fares would not be unfair for the stages.

	Days. —	Fare. £.
Calcutta to Madras - - - - - - - - -	4	10
Madras to Ceylon - - - - - - - - -	3	8
Ceylon to Camaran or neighbouring parts of the Arabian coast - - - - - - - - - - -	15	35
Camaran to Cosseir - - - - - - - - -	4	10
Camaran to Suez - - - - - - - - -	7	18
Calcutta to Cosseir - - - - - - - -	28 ½	65
Calcutta to Suez - - - - - - - -	30 ½	70
Alexandria to Gibraltar - - - - - - - -	19	22
Gibraltar to Falmouth - - - - - - - -	6	16
Alexandria to Falmouth - - - - - - - -	16	36

But I think it will probably be found to be more profitable to reduce all the fares below these rates.

1577. Can you give the charge for the whole distance without dividing it?—I am sure it could be done with a profit for first-class passengers at 100 *l.*, and for passengers with inferior accommodation, more closely crowded together in the vessel, for 60 *l.*, and that including their provision. Much depends on the space you

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you allot in the vessel to the passengers and upon the accommodation they require. I understand the class of passengers who now run is generally wealthy, a people who want very luxurious accommodation; in that case you must charge of course a proportionably high fare; but I think 100 *l.* for the first class, and then intermediate sums for different accommodation, between that and 60 *l.* or 70 *l.*; would yield a considerable profit; I think it would yield more profit than 150 *l.*, by increasing the number that would go.

1578. Are you aware what the present charges are by the Cape of Good Hope?—They vary very much in different vessels; you can go in some vessels for so low as 90 *l.*, I believe at 80 *l.* you can get out for, and others charge 120 *l.*

1579. You mean for first-class passengers?—Yes, for first-class passengers 120 *l.* is generally paid, I believe.

1580. It has been already stated in evidence that it would be impossible to accommodate the passengers comfortably in steam vessels by the Red Sea under from 150 *l.* to 200 *l.*?—Well, that will entirely depend on the number of passengers who go; such a statement as that must be understood in a very qualified sense. If there be a sufficient number of passengers go, they will accommodate them for a great deal less; if few go, of course the expense of your enterprize must be shared among few, and therefore high prices must be charged; but I anticipate, from what I see of the actual numbers who now go round by the Cape, and from what I know of the facility that may be afforded them in the steam communication by the Red Sea, and from what I also know as to the general effects of expedition, it could be done for the sums I stated more profitably than if 200 *l.* were charged.

1581. Can you give any opinion as to the comparative amount of correspondence and mercantile intercourse between the different presidencies and this country?—Yes, I have got it here; I will give it in if you please. The number of letters conveyed between Britain and India at present, or within the last few years is at the rate of 309,000 annually; of these 54,000 communicate with Bombay, 12,500 with Ceylon, 71,000 with Madras, and 170,000 with Calcutta; so that out of the 309,000, Calcutta has 170,000, and Madras 70,000, that is 240,000 between the two. Then the passengers 3,200 annually, of whom 1,450 go to Calcutta, or between Calcutta and England; Madras 1,050, Ceylon 100, Bombay 600. The estimated gross commerce is nine millions, of which two millions and a half are to Bombay, one million to Madras, and five millions and a half to Calcutta. Now these may be taken to represent the exigency which those different presidencies have for the improved means of communication.

1582. Is it your opinion that many letters would be sent by the Cape of Good Hope, when once the other communication is established?—That of course will depend on the postage.

1583. Taking the postage at what you are aware it is, according to the Act of Parliament?—The impression I have is this: that a great part of the correspondence, all that part of the correspondence which is of a commercial nature, is of a nature to which expedition is so important, that almost any price would be paid for it; and that the difference of postage which is now proposed is such, that I think all that portion of correspondence would certainly go by the steam communication, and a large portion of correspondence of private families anxious to hear from their friends and relations, would likewise, at least of the respectable families, go by it. They would not consider the expense, it is quite evident; we have only to appeal to our feelings to know that. Of the letters which at present go free, which amount to 309,000, about 90,000 of those letters are for private soldiers; these most likely would go round about still, or go whichever way they could be carried cheapest; but there are 220,000 letters that pay postage now, and I think considerably more than half of these would certainly go by the steam communication, even at double their present postage.

1584. Is it your opinion that the commercial intercourse will be greatly increased between India and this country by the greater facility of communication? —Undoubtedly; it always is so. Facility stimulates commercial speculations, and it is well known in the commercial world, that nothing has clogged the spirit of enterprize more than the length of time which is now necessary to learn the state of the markets between the two countries.

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1585. Is it your opinion that means could be found of preventing any additional rates of insurance being charged in consequence of the necessity of transferring the cargoes from one vessel to another?—I do not apprehend that much danger will arise from that. The source of danger would most likely be the carrying across Egypt; for one steamer coming alongside another, and giving in the only kind of cargo which can be expected in this case, which is a cargo of light and valuable things; I do not think there would be any source of injury.

1586. You have devoted a good deal of your time to inquiries into the best machinery applicable to steam vessels for long voyages?—Yes.

1587. The Committee are anxious to ascertain what your opinion is with regard to the machinery which should be adopted in vessels intended for such voyages, in reference to the improvements lately effected?—The machinery to which the Committee have to direct their attention, consists of two parts, very distinct from each other, namely, the working machinery and the boilers. With respect to the working machinery, I have no other observation to make than this, that I would recommend it to be constructed by the very best makers in this country, of the highest reputation, such as Boulton & Watt, and Maudslay & Field, to insure its excellence; that I would recommend the engines to be constructed so as to work expansively, the valves to be made in the same manner that they are now being made for the vessel which is being built to work between Bristol and New York, the engines of which are in process of construction by Maudslay & Field. The valves of those cylinders are so constructed that the engineer can cut off the steam at any portion of the stroke he pleases; this is of very great consequence in a case like this, where the economy of fuel is a matter of importance, because in the monsoon for example, it will sometimes happen, when you are going with it, that you need not use steam at all, you will run with the monsoon in the outward passage very often without steam. Frequently it will happen that you will wish to work very much under your power, availing yourselves of the wind to a considerable extent, but helping out the wind by a certain portion of steam, the engine-man will then cut off the steam, perhaps at a fourth or a fifth or a sixth part of the stroke, letting it expand the rest, and the consumption of fuel will not only be diminished in the proportion in which he cuts it off, but in a higher proportion, from the expansive action of the steam, and therefore I think the expansive valve a matter of very considerable importance. It is with respect to the boilers, however, that the greatest difficulty will be felt, and the greatest doubt lies about the best mode of proceeding. The difficulties consist in this, generally we are obliged to use sea water in them. In the boiling of the sea water, the salt and lime and other solid matter which is held in solution, is precipitated, the steam goes over, leaving these solids behind. After the boiler has been worked for a certain length of time, the salt which remains behind from the evaporated water, mixes up with the water that remains, renders it salter and salter, until at length it becomes what chemists call a saturated solution, that is, it can hold no more salt in solution, and immediately then the salt becomes thrown on the surface of the boiler, precipitated in a solid form, and adheres; there is an affinity between the metal of the boiler, especially at that high temperature, and the salt, and it clings to the surface of the boiler, makes a solid wall round about it, a thick lining of this deposit, which has the effect of intercepting the heat of the fire; that heat which ought to pass into the water, remains in the metal of the boiler; and if this incrustation be allowed to collect to any considerable thickness, the metal will be liable to be made red hot, to soften and to have cracks in it, and the boiler to be gradually destroyed. Now this is the main evil that is to be guarded against, and many ways have been suggested from time to time by different projectors of remedying this evil.

1588. In reference to the deposit in boilers, are you aware that there is a very great difference in the quantity of saline matter contained in the water of the Indian Ocean and the water of the Red Sea?—I have not seen any analysis of this, but I should hardly expect a very great difference, as far as regards the muriate of soda.

1589. And lime?—Lime is a very small portion in any sea water; I can give the precise proportions if you wish it the next day, but the fact is, the muriate of soda constitutes the great bulk of the deposit; there is a little lime and a little sulphate of soda, and a little magnesia, but these are present in extremely small proportions; it is quite true that the lime, as far as it does exist, is the most mischievous; it lays hold of the boiler more tenaciously; it gives con-

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sistency and solidity to the muriate of soda, forming an incrustation instead of a loose deposit; but I should hardly expect it would have any very material effect from any difference of proportion that could subsist between sea water in one place and sea water in another place.

1590. Are you aware the officers of the Hugh Lindsay have reported that in consequence of the very great difference which existed in the quantity of deposits in the two seas, that they were under the necessity of blowing off much more frequently while performing the passage of the Red Sea than that of the Indian Ocean, which, of course, must lead to very great delay, and very great expenditure of fuel?—I have heard that such a report was made, but I did not attach much importance to it. The fresh water will have more lime.

1591. Are there any remedies that you could suggest for obviating the evils that you speak of in steam boilers?—There are the ordinary remedies which have been tried, and I can scarcely say that any of them are perfectly effectual; by far the most common one is that which is called the process of blowing out, which consists in expelling the super-salted water from the boiler, and introducing ordinary sea water in its place. If this process were conducted with regularity, the water in the boiler ought never to be allowed to become a saturated solution, you should continually introduce such quantities of sea water as would drive out the water before saturation: but to this there are objections; there is the immense loss of fuel from continually cooling the water in the boiler; you are driving out water at a high temperature, and letting in water at the common temperature of the sea. The consequence is that you are purchasing a clean boiler at the expense of a considerable quantity of fuel. Then the process, if conducted otherwise, is to allow the deposit to collect to a certain extent, and then it is blown out mixed with the water. Now although this process has been enforced as far as it is possible for the owner of the vessel to enforce it, still, notwithstanding, incrustation is found to collect; I have taken off the interior of boilers incrustation two inches thick from boilers in which this process was enforced as rigorously as it was practicable to enforce it; for I ought to observe, that it is a process extremely difficult to get regularly executed; the engine-men feel that they are impairing and crippling the rate of the vessel, and they have a natural reluctance to do it. Now another of the remedies besides that blowing out, which has been suggested, is the substitution of copper boilers for iron boilers; it is found that the salt which collects on the surface of the iron boilers is less liable to collect upon copper; some will tell you it does not collect at all, and that they remain perfectly clean, and that nothing but loose deposit is collected, and that that loose deposit may be blown away without harm: but I know that that is not the case, that an incrustation does collect on the surface of the copper, though not in the same degree as on the surface of iron boilers. Now I will give you an example: I have got here a tube, three inches internal diameter, which I took out of a copper boiler at Hull. This tube was taken from a marine boiler which had been two years in operation between Hull and Hamburgh, and the owner assured me that the process of blowing out was observed as rigorously as it was in his power to enforce it, and he asserted his belief that it was fairly executed. Notwithstanding that, this tube is completely stopped; it is not a crust that is collected on it, but it is actually choked by a deposit as hard as marble. Then another remedy which has been proposed for this evil, and which is now in process of trial is an expedient which is known by the name of Hall's condensers. The source of the evil, as I have explained to the Committee, arises from our being compelled to work with sea water; if any expedient could enable us to work with fresh water, still more with distilled water, it is obvious, that the evil would be perfectly removed; and the object of the contrivance to which I now allude has been to enable us to do this, to work always with the same water, and therefore, always with perfectly pure water. Now the Committee will probably be better able to estimate the efficiency and merit, or rather the probability of efficiency in this contrivance, if I state to them it is not a new one. The celebrated Watt, at a very early epoch in the history of his discoveries in steam, and even before steam was intended to be applied to navigation, constructed a condenser of this kind; he conducted the steam as it was drawn off from the cylinder through a multitude of small tubes, which small tubes were carried through a vessel which was constantly supplied with cold water;

the steam, thus divided into threads, and compelled to pass through those tubes exposed to the affusion of cold water, was of course condensed. Mr. Watt tried this, he laid a drawing of it before Parliament, which drawing is now in the possession of his son James Watt, and I have seen it, signed by authorities indicating its having been before Parliament. This condenser is in fact Hall's condenser. I have read manuscripts of Mr. Watt's on the subject, and I find it was abandoned by him in consequence of his finding, first, that he never could make a vacuum sufficiently sudden and perfect by it; and secondly, because the tubes constantly got a fur collected on them, intercepting the cold water just as the crust intercepts the heat in the other case; and in fact it was abandoned by him at that time as a hopeless thing. Mr. Hall, of Nottingham, has revived it, and has taken out a patent for its application to nautical engines, for the purpose of preventing incrustation; it is exactly the same as Mr. Watt's. It consists of a number of small copper tubes through which the steam is compelled to pass, as it escapes from the cylinder, which tubes are exposed to the cold water exactly in the same way, and the condensation is effected in that way; when the steam is condensed it is passed through a forcing pump, and driven back again into the boiler. The waste which must take place in this case, which will be produced by more or less of this water getting away, one way or another, by leakage—he replaces the waste by a small still in which he distills sea water, which could easily be done if there was no other objection to his contrivance. Now these condensers have been constructed in a great number of private vessels. I have seen them in vessels in almost all the ports in England, and I have examined them myself personally, but it is not by merely looking at such things, nor seeing them working, nor by examining the barometer, nor by any mere inspection of the machinery, that a correct conclusion can be obtained about them; it is only by a careful examination of logs fairly kept, giving an account of the state of the barometer gauge, the consumption of fuel, and the actual way the vessel makes for a considerable period of time. It is from this, and from this only, that correct conclusions can be deduced; one of the short ways of arriving at a conclusion certainly would be the examination of the barometer gauge; the question that would present itself to any one conversant with the subject would be, does this mode of condensation really produce a vacuum on the other side of the piston, does it really give mechanical effect to the steam by destroying the resistance on the other side; now most unquestionably, the gauges in those engines do indicate a very superior vacuum.

1592. Will you state what the indication is?—They indicate a vacuum very nearly equal to the barometric vacuum. Now, this however, is attended with a circumstance to which I wish particularly to point the attention of the Committee. There is an appendage to the condenser of the common steam engine, called an air pump; the object of this instrument is to pump away the cold water which is introduced into that condenser, to pump away that cold water and clear the condenser of it; but the purpose from which it derives its name is to pump away atmospheric air, a permanent elastic fluid which enters with the cold water which is introduced to condense the steam: cold water in the common state always contains a certain quantity of atmospheric air combined with it, and it is to get rid of this mischievous fluid that the air pump is mainly there. That is the use of the air pump in the common steam engine. In Hall's condensers he has no jet, he introduces no cold water to condense the steam, he consequently introduces no air to be pumped away, and therefore there is nothing remains to be removed from his condensers, except the pure water resulting from the condensation of the steam, and to remove that, it is obvious that an extremely small pump ought to be sufficient. Notwithstanding that, Mr. Hall thinks it necessary, for the proper efficiency of his engines, not only to use as large an air pump as is used in the common condensing engine by jet, but he even advocates the use of a larger. If then there be attached to an engine where there is no air to be pumped away, and where there is no condensing water to be pumped away; where there is nothing but the mere condensed steam to be pumped away—if there be attached to that an enormous air pump, there is no wonder at all that there should be a good vacuum kept up; for you can keep up a vacuum without a condenser at all, if you will only give us a sufficiently large air pump. That, therefore the barometer gauge in those vessels in which Hall's condensers are used should show a very high vacuum with so extensive an air pump in them is not at all surprising, and in my opinion indicates nothing as to the efficiency of the engine.

1593. Have you any reason to know that the air pumps used in those vessels where Hall's condensers are applied, are larger than the air pumps which would be used in the case of common condensers?—Mr. Hall told me himself that they are as large, and he even said that he would wish them to be larger; but I contend that they ought not to be there at all; I contend that there ought to be no air pump, but only a pump to pump away the condensed steam. And that if there be an air pump there of considerable size, either as large or nearly as large as the air pump of a common steam engine, I say that that air pump is in fact producing the vacuum, which is not produced by the condensers, and that the whole thing is a juggle. It is quite clear, that if you spend your power in working your air pump, you are doing nothing; it is just the same as if you were taking money out of one pocket and putting it into the other; you are doing nothing at all.

1594. Then how can you reconcile this opinion with the declarations that have been made by different persons who have been in those steam vessels for a long period, and who have declared that there is not only an increase of power in the same engines, but, with the addition of Hall's condensers, there is also a saving in the consumption of fuel, to the extent of one-fourth?—I have heard that and I have heard the contrary. I do not wish to be understood as offering these observations with a view to condemn Hall's as a bad principle; it may be a good one for anything I know; but I offer them merely as grounds for throwing a doubt for the present upon the thing, until we see it more extensively tried. I should even go so far as to recommend the adoption of Hall's condensers in the vessels at this side of Egypt, because they are always within reach of repairs, and if any difficulty should arise, they are in the neighbourhood of relief. But we ought to be extremely cautious in introducing novelties in the vessels on the Asiatic side of Egypt.

1595. But your opinion is, that if the advantages stated should be demonstrated by a lengthened trial in any vessel or vessels, fitted with Hall's condensers, it is an improvement of so much importance that it ought to be applied to vessels, and to those particularly now building, where long voyages were to be made by such vessels?—I think it very material, and if I had an opportunity of examining the performance of a vessel with Hall's condensers for a period of a year, in average circumstances of weather, and that I had a good log of that vessel, I would myself then form a judgment of it.

1596. Are you aware that Captain Wright, who commands the Prince Llewellyn steam packet, on board which Hall's condensers have been in operation for a considerable length of time, has reported most favourably of their action?—Yes; I am aware that reports have been made by him, also by Messrs. Lloyd & Kingston. I have also had many favourable reports from private quarters, where they have been used, but I have also had unfavourable reports. I have heard of instances where they have been introduced into a vessel, and taken out again, and this on the other hand has been accounted for by Mr. Hall's friends, by other motives.

1597. Are you aware that Mr. Fox has reported to the Lords Commissioners of the Admiralty that he has worked an engine with Mr. Hall's patent condensers for upwards of three years, and that he finds in it a considerable increase of power and saving of fuel?—I am. I have met with several reports of the same kind from different other persons for other lengths of time.

1598. Should you take that report to furnish good authority?—*Quantum valeat*; it is a very vague, general thing; it rests entirely on the judgment of Captain Fox.

1599. Can you state the general advantages; you have already stated one advantage arising from Hall's condensers; can you state whether there are any other advantages which in your opinion should recommend those condensers to general adoption?—No, I do not see any advantage beyond keeping the boiler clean, and thereby economizing fuel; of course there is the economy produced by saving in the wear and tear of a boiler; an iron boiler, with the common condensers, will last about three years, while with him it would last seven years at

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at least; and I can also vouch for this, that the contrivance is efficient in doing that which it professes to do, namely, in keeping the boiler free from deposit; for I have seen water taken out of a boiler which had been six months in it, and it was perfectly free from all sediment or deposit.

1600. Then it is your opinion that the boiler being freed from that deposit, or the danger of that deposit, there must be necessarily greater economy in fuel?—Decidedly.

1601. One must follow as a natural consequence from the other?—Decidedly.

1602. It is stated also by Mr. Hall that the valves and pistons are better lubricated by his improvement than in the common way?—He says so; I cannot vouch for the fact that they are so. The lubricating apparatus is an ingenious thing; but I do not think it is of the same importance as the other part of his invention.

1603. You do not apprehend any inconvenience arising from the mixture of the oil in small particles with the steam?—That is one of the objections brought against his contrivance; that it is liable to that. The water will get gradually greasy: nevertheless, I must say that I have seen water taken out of a boiler which has been six months in use, as I stated to you, and very little of that in it.

1604. It is also stated that that part of the boiler which is immediately above the water line is apt to become oxydized, and that the oil floating on the surface coats that part, and prevents oxydation, and the injury which the boiler would otherwise sustain?—It is very likely that the floating grease would produce such an effect. At the same time I never heard it complained of, that any injurious oxydation really takes place in boilers.

1605. Can you state the difference between Howard's principle and Hall's? —They are quite different.

1606. Will you state the principle on which Howard proceeds?—Yes, Howard's contrivance consists of getting rid of the boiler altogether: he has no boiler; the contrivance consists in making steam without boiling the water; in short, a quantity of quicksilver is placed in an iron pan over a coke fire, and kept at a temperature greatly above the temperature of boiling water; at a temperature something under the temperature of boiling mercury. A jet of water is injected on the surface of this hot quicksilver, which flashes into steam immediately upon contact with it. This steam, in a highly expanded state, is introduced into the cylinder, and works the piston in the usual way. It is re-converted into water by being passed through a worm, and returns to the vessel from which the jet is admitted to the quicksilver; of course, as there is no boiler there can be no incrustation, and the same water being used constantly over and over again, it may be distilled water.

1607. Are you aware whether any experiments worth mentioning have been made with regard to that plan of generating steam?—It has been some years in process; experiments on one or two voyages of some length have been made attended with favourable results, but also accompanied by unfavourable accidents, which caused Government to decide upon abandoning further trial, and leaving it in the hands of the projector, the projector is now engaged in constructing vessels and making further experiments on a larger scale, but it has not attained to that point of certainty which would warrant its adoption even on this side of Egypt, and much less on the Asiatic side.

1608. Have you made any inquiries, or can you speak with any certainty as to the probable cost of coal in the different ports of India, and also in the ports of the Red Sea which are proposed for depôts?—It is extremely difficult to say what the cost will be for the quantity that will be required: if the quantity of coal which ships can take out in ballast be sufficient for working the line of vessels, coal may be had at a moderate price in India, but if more coal is necessary than the ships can take out in ballast, and if ships must be freighted with coal expressly, and probably have to come back in ballast, then that additional portion of coal will of course cost a higher price. I am not acquainted with the amount of tonnage which now goes out in ballast, and therefore I am not able to say what the cost would be under such circumstances. But from the best information which I have been able to procure, the nearest approximation

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I can make to it is, I should say, that in India coal might probably be obtained for from 35 *s.* to 40 *s.* and in the Red Sea from 60 *s.* to 70 *s.*

1609. You have I think stated in your work, that the highest price of coal in the Red Sea would be 60 *s.* ?—Sixty shillings; yes, I think that is it. That is supposing it to go round.

1610. Do you still adhere to that opinion ?—I am inclined to adhere to that opinion.

1611. Do you think it could be had at a cheaper rate, transferred from this country to Suez, across the Desert ?—It could not be transferred without a railroad I think at all; on the backs of camels I should think it would be very difficult indeed to transfer it. If a railroad were made from Cairo to Suez, it might be brought in boats up the Nile to Cairo, and might be sent by railroad across to Suez at a moderate expense; then that would greatly affect indeed the price, and that is the only point of view in which I conceive a railroad would be desirable there.

1612. But until the establishment of a railroad, you do not consider it could be transferred ?—I hardly see how it is possible that coal could be got across at any reasonable rate.

1613. Looking to the different sorts of coal which are to be obtained in this country, do you attribute great superiority to the Llangennech coal over other coals ?—It is a stronger coal, certainly, and a given weight of it will produce a greater quantity of steam in a certain proportion than the coal of the north of England. But this advantage has been greatly exaggerated, and it has been kept out of view, that it is attended with corresponding disadvantages of a very serious kind. One of these disadvantages is, that the small coal is utterly useless; and that is obviously of greater moment when you have to send the coal round half the globe, liable to all the circumstances of transhipment, and lodging and lying in different places, and consequently to the production of a greater quantity of small coal. It is also, I apprehend,—though perhaps this may not be a very serious objection,—more liable to spontaneous combustion.

1614. Therefore you think that other descriptions of coal may be used with as great advantage as the Llangennech coal ?—Most decidedly; but at all events the difference between different kinds of coal is never worth consideration when a question of convenience in export is to be considered.

1615. And, therefore, that from whatever ports vessels take coal in ballast, the description of coal they will take will be sufficient ?—Amply sufficient for all the purposes of the east. The fact is the runs which we contemplate are so far removed from the extreme power of the vessels to run, that the difference between one coal and another coal never can be a matter of any very great moment.

1616. Considering the greater degree of heat which prevails in the east, do you not consider that it would be advisable, in this point of view, to have a constant change of vessels as well as engineers; do you suppose that the engineers and the stokers could do as much duty in those climates as they are in the habit of doing in milder climates ?—Certainly not; and I have taken that into account in the estimates which I have given in the pamphlet I have published on the subject.

[*Witness gave in the following paper:*]

The first cost of a steam ship of 1,000 tons, with machinery of 250-horse power, well appointed in every respect, and supplied with the very best machinery, complete for sea, would be £. 30,000. Taking the duration of the vessel at 15 years, the following statement will show the annual charge of maintaining such a vessel, exclusive of the fuel, the officers and crew.

	£.
Capital sunk annually on vessel and machinery, the vessel to last for 15 years - - - - - - - - - -	2,000
Interest on capital, at 4 per cent. - - - - - -	1,200
Insurance, at 7½ per cent. on half the capital - - - -	1,125
£.	4,325

The annual expense for maintaining six vessels would therefore be £. 25,950.

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To this must be added the salaries and wages of the officers and crew, the engineers, stokers, &c., together with the repair of the machinery, &c. as follows:

	£.
Commander	400
First mate	200
Second mate	130
Third mate	66
First engineer	300
Second engineer	200
Third engineer	150
Eight stokers	400
Ten seamen and 20 lascars	720
Maintenance of officers and crew	1,380
Engine-room stores	400
Ship stores	300
Repairs of vessels, machinery and contingencies	1,864
£.	6,500

The whole annual cost of the establishment between India and Suez (exclusive of stations) would therefore be as follows:

	£.
Maintenance, &c. of five working vessels and one spare vessel	25,950
Fuel	33,750
Salaries, maintenance of officers, crew, &c. repairs of vessel, machinery and contingencies, for five working vessels	32,500
£.	92,200

Assuming that suitable wheel-carriages are provided for the transport of passengers between Cairo and Suez (to which there is at present no physical obstacle, and to which the ruler of Egypt is understood to be favourably disposed), the journey between these places may be performed by passengers with ease and certainty in five or six days, and with despatches alone would be effected by a courier in much less time. But by whatever means this part of the communication is made, it is absolutely necessary that it should be conducted under the same management, and the same responsibility, as the remainder of the route.

The distance between Alexandria and Falmouth is 2,800 miles, which might be performed by a steam ship of the same tonnage and power as those which I have recommended for the eastern side of the Isthmus. It would be necessary (if the same vessel be continued through the whole passage from Alexandria to Falmouth) that she should take in coals at Gibraltar. This vessel would effect the passage between Alexandria and Falmouth in about 15 days, in average weather; and if one day be allowed, either to take in coals at Gibraltar, or if it were thought more advisable to transfer the passengers, &c. to another vessel, the total time between Alexandria and Falmouth would be 16 days.

Thus the whole time, allowing for the necessary stoppages between the several ports of India and London, would be as follows:

Time between Calcutta and London:	*Days.*
Calcutta to Suez	30 ½
Suez to Alexandria	6
Alexandria to Falmouth	16
Falmouth to London	1 ½
Time between Calcutta and London	54

Time between Madras and London:	
Madras to Suez	25 ½
Suez to London	23 ½
Time between Madras and London	49

Time between Ceylon and London:	
Ceylon to Suez	21 ½
Suez to London	23 ½
Time between Ceylon and London	45

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Time between Bombay and London :	*Days.*
Bombay to Suez - - - - - - - - - -	19
Suez to London - - - - . - - - - -	23 ½
Time between Bombay and London - -	42 ½

These estimates of the time of the passage are of course to be taken as average calculations. In the height of the south-west monsoon the outward passage would probably be shorter by several days than the times given above, while the homeward passages would be proportionably longer. During the north-east monsoon the homeward passages, on the other hand, would be occasionally several days shorter than the time computed, while the outward passages would be on the contrary longer.

The maintenance of the communication between Alexandria and Falmouth, with the necessary regularity and certainty, would require three steam ships. As, however, it may be presumed, that a portion of the passengers arriving from India at Alexandria, would adopt other routes, vessels might be adapted for this passage of less capacity and power than those proposed on the Asiatic side of Egypt. I would propose, therefore, to establish between Alexandria and Falmouth three vessels of 800 tons burthen and 200-horse power. The fuel consumed by such vessels in making 24 passages, computed upon the principles already explained, will be 65,000 tons, the cost of which may be taken at 8,000*l.*

The annual expense and the maintenance of these three working vessels would be about 2,400*l.*, calculated upon the same principles which have been already applied to the steamers on the eastern side of Egypt. Thus the total annual expense of maintaining the establishment on the most efficient scale, exclusive of the stations, would be as follows:

	£.
Annual expenses already estimated on the eastern side of Egypt - -	92,200
Expenses of agency in Egypt - - - - - - - -	2,000
Expenses of establishment of steamers between Falmouth and Alexandria, including fuel, &c. - - - - - - - -	32,000
£.	126,200

The adoption of vessels of inferior magnitude and power would somewhat lessen the estimated expense, but would in a far greater proportion diminish the efficiency of the establishment, and increase the chances of its failure.

I have allowed eight stokers, I think, to a vessel, and two engineers; no, I have allowed three engineers in the establishment for a steamer in the east. A first, second and third engineer at salaries, the first at 300*l.* a year, the second 200*l.* a year, and the third at 150*l.* a year. I have been mainly influenced in these recommendations by the consideration of how important it is to have a great quantity of mechanical skill at such a distance from the means of repair as that will be; and I have recommended eight stokers, which is an unusual complement of that class of men for such engines, partly in consequence of the heat of the climate, and also in consequence of another circumstance, which I would wish specially to impress on the attention of the Committee, namely, that the economy of fuel depends, in a very great degree indeed, upon the attention and skill in stoking: according to the way in which the fires will be stoked you may produce a saving of fuel fully to amount from 20 to 25 per cent.; if the coals are shovelled in in an enormous quantity and the fire places choked with them, the door then shut up, and the men sit down to rest, the consequence will be that you will produce a prodigious smoke from the chimney, the fire is impeded for the moment, and your coals will be wasted. If, on the other hand, you stoke your fires in the manner that smoke-consuming furnaces are stoked, by laying in coal gradually, and in small quantities, on the front of the grate, and as it reddens shove it back towards the back, you will have no smoke from the chimney; you will consume all your coals, you will gain from them the greatest quantity of heat which can be obtained in that kind of furnace, and the result will be a saving according to the care and skill with which this is executed, of from 20 to 25 per cent. of your fuel. Now this can only be accomplished by selecting good stokers, paying them well and not overworking them; but while they are stoking, make them stoke; let them have an abundant quantity of rest, but while they are in the stoking room, keep them constantly at work. It is found in the Admiralty vessels that the judicious selection of

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stokers, and the enforcing of a rigid duty from them, has produced a most material effect in the economy of fuel; and I would also strongly impress upon the Committee the expediency of insisting upon the captains of the vessels knowing something of the mechanical part. It is utterly vain to think of managing these vessels so far from Europe as they will be, if the captain is the slave of his engineer, and he always will be the slave of his engineer if he is not himself acquainted with the details of the engine. It will be quite essential that he should be conversant with the details of the engine.

1617. In the event of the application in the vessels proposed to be built of Hall's condensers, do not you look upon it as a great advantage, the possibility of keeping the water at an equal height in the boiler, so as to save the necessity of that close attention on the part of the engineers and the attendants which would be otherwise required?—Yes; it would be an advantage, but that can be obtained by the common boilers, by making them feed themselves, by float gauges and other apparatus, that have been supplied just as well with other boilers as with Mr. Hall's.

1618. Does not it very often happen, that float gauges and the other modes which are adopted for that purpose, are found to fail?—Not except through gross neglect, there must be gross neglect on the part of those who manage the vessel or the machinery of it.

1619. If you draw off the steam pressure suddenly, which may be the case from different causes, the water will suddenly boil up, and there will be in consequence an immediate change of level; in a case of that kind will not a float gauge be likely to deceive as to the height and quantity of the water in the boiler?—I should recommend always the self-acting feeder to be used in connexion with the float, which will prevent the level of the water from subsiding below the proper point.

1620. Should you approve of wrought-iron boilers in preference to copper ones?—No; I should advise the copper boilers; though they are double the expense, yet they last a greater length of time and the old materials are available for sale at a considerable price afterwards. That is, I would advise copper boilers if you do not find it expedient to adopt Hall's condensers, for it would be quite useless to go to that expence if you do.

1621. In the event of not using Hall's condensers, would you recommend the use of copper boilers in preference to iron ones?—Yes.

1622. Do you apprehend that there would be less liability to explosion or accident from the use of those boilers?—I think they would be less liable to explode, and if the boiler burst it would be attended with less danger.

1623. Is it your opinion, that explosion may take place in wrought-iron boilers by a combination of oxygen and hydrogen, whether produced by decomposition or any other cause?—I am inclined to think that explosion could not happen from that cause.

1624. Therefore you do not contemplate any case in which an explosion from the mixture of the gases in their explosive proportions could happen?—I am sure it could not happen.

1625. Do you think it would be advisable to apply any improvements of the paddle wheels that have been lately effected; for instance, those of Mr. William Morgan?—I admit that the performance of vessels having Morgan's paddle wheels, is better in a considerable proportion than with the common paddle wheels; that the same quantity of fuel will carry the vessel further with Morgan's than with the common paddle wheels; but I think that their mechanical complexity is such, that if any accident happened to them in the Indian seas, which would disable the vessel, they could not be repaired with any skill or means which would be available in such a place; and I think that though that accident may not be very likely, still the liability to it forms a serious objection to adopting them on the Asiatic side of Egypt. I would recommend their adoption in the steam ships on the European side. There is another form of paddle wheel differing from the common one, and which I believe will prove to be more efficient than the common one, which is less subject to this objection. It is called the split paddle; the paddle board, instead of being one uniform flat surface, is split into a number of narrow leaves placed one beside another, not very unlike the position of the plates in a Venetian blind. We have not had this used as extensively in practice as Morgan's wheel, and therefore have not that practical evidence of its advantage which we have of Morgan's wheel; but looking at it theoretically, I should say it promises to be attended with advantages over the common paddle wheel, and it has this great advantage, that it is equally simple, that the fracture of one of the paddle boards would be as easily repaired in that as it would in the common paddle wheel, and in some respects, perhaps, easier; and I think, therefore, it is worth consideration, whether it might not be advisable to adopt these split paddles.

1626. In giving this opinion, you of course contemplate the necessity of shipping and unshipping the paddles?—No; I fear that would be attended with very great difficulty, the shipping and unshipping the paddles: the Medea, to which I have so often referred, is remarkable for combining good sailing qualities with good steaming qualities, but the Medea does not unship her paddles; the Medea sails with her paddles in the usual place.

1627. She has Morgan's paddle wheels, has she not?—She has.

1628. Then you do not think it would be advisable to disturb the paddles?—If you could contrive a means of unshipping the paddles, I think it might be advisable to unship them in the south-west monsoon, when you are going the outward passage; but as yet I have seen no means of unshipping them which is not attended with such objections as to make it more advisable to leave them in their fixed position; it is of the very last degree of importance that when the paddles are in action they should be in the most stable, firm and strong position, and, therefore, any means of unshipping them must be a means compatible with restoring them to their position with that degree of stability and strength which one can scarcely imagine to be matter of temporary adjustment, alterable at pleasure at sea.

1629. Do you think it expedient that there should be a connection between the present establishment of Mediterranean packets and the Indian one, or that there should be separate establishments?—I think there ought to be a separate establishment; if the Indian line of communication be successful it will support a separate establishment, and if unsuccessful it will be likely to be discontinued, so that in any case I think the question of Mediterranean steamers may be put out of view.

1630. Are there any other reasons that you have to assign why it would not be advisable to employ the present Mediterranean steamers?—You must observe the reason is the interruption that it would occasion to the line of communication, and the delay. A steamer arriving from India at Suez, sends her passengers, despatches and cargo to Alexandria; we will suppose that a steamer, plying between Malta and Alexandria, meets them there, is ready for, and takes them to Malta; she arrives at Malta at a time when, probably, it is a few days after the Malta steamer has gone, the passengers have, in consequence, to wait at Malta for a month before they will have another opportunity of going on, and the same may be said of the despatches.

1631. And with regard to quarantine, does any objection present itself to you?—By the present rules of quarantine, if they go to Malta, they must stay there. If they do not touch at Malta they can come on if they please to Falmouth, and perform quarantine off Falmouth, but if they go to Malta at all, they must, with the present regulations at least, stop there, and the consequences would be these, that the passengers and despatches must be separated, because they would not keep the despatches at Malta, and a means must be provided of sending on the despatches separate from the passengers.

1632. You think, therefore, it would be proper, under all circumstances, to perform quarantine at Falmouth in preference to Malta?—Decidedly; I think it almost essential to the success of the enterprise, considering it as a passenger line.

1633. Should you recommend the steamers between Alexandria and Falmouth to be of the same size as those recommended for the eastern seas or of a diminished size?—When I first considered this question, I felt myself justified

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fied in recommending steamers of 800 tons burthen, to work between Alexandria and Falmouth, but when I consider the splendid establishment of steamers which have been lately organised by the French government, and the many temptations which would exist to passengers to go by various points of Europe and overland, I think that a smaller class of vessel, say from 600 to 700 tons burthen, and from 160 to 200-horse power, would probably be sufficient for the line between Alexandria and Falmouth. This, however, is matter of minor importance in the present case, because, whatever arrangements might be made between Alexandria and Falmouth, would be changeable from time to time according to circumstances with the greatest ease, because one vessel could be substituted for another, from the abundance which will always exist on this side of Egypt.

1634. Have you any reason to know that the French steamers make greater way than English steamers of the same size?—I have no reason to know it.

1635. Can you form any opinion, or have you turned your attention to the expediency of sending correspondence from England to India by Marseilles?—If efficient steamers are established between Alexandria and Falmouth, I hardly think that any thing would be gained worth separating the despatches from the passengers by sending them across Europe.

1636. You do not think it would be important for the mails to gain a certain number of days?—At present I do not think they would gain it; I think it would be important to gain it if they could, but I do not at this moment see that much time could be saved.

Lunæ, 10° *die Julii*, 1837.

MEMBERS PRESENT.

Mr. David Barclay.
Lord William Bentinck.
Sir John Hobhouse.
Mr. Hutt.
Mr. Mullins.

LORD WILLIAM BENTINCK, IN THE CHAIR.

Captain *Mackenzie*, called in; and Examined.

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1636.* *Chairman.*] YOU belong to the Bengal cavalry?—I do.

1637. When did you leave India?—I left India in December 1835.

1638. How did you come from India; by what route did you come from India?—I came in a native Indian vessel from Calcutta, up the Red Sea, through Egypt.

1639. At what season?—I came in the north-east monsoon, during the months of December, January, February and March.

1640. Did you come with your family?—I came with my wife and one child four or five years of age.

1641. Where did you stop during the passage?—We touched at Cochin, on the Malabar coast, and afterwards at Mocha and Jidda.

1642. What winds prevailed in the Red Sea during your passage?—When in the Gulf of Adan, immediately outside the Red Sea, we had the south-east wind blowing very strong, and the same south-east wind carried us up to within two degrees of Jidda, where we met the north winds, and we were obliged to beat up against them, and at last we got into Jidda harbour. I think the south-east monsoon very seldom extends much higher than the 16th or 17th parallel of north latitude, after that you are subject to northerly winds.

1643. After leaving Jidda, what then?—I stayed at Jidda about three weeks waiting for a ship, and afterwards went up to Cosseir.

1644. In what?—In the same native vessel, which got a freight from the Pacha of Egypt, to bring down troops and stores for his army in Arabia.

1645. How long were you doing that?—We were seven days between Jidda and Cosseir, beating up against the north wind and calms the whole way.

1645*. Then the north wind was not violent?—It was only violent for the first day.

1646. From Cosseir where did you go?—From Cosseir we crossed the Desert to Thebes, in five days.

1647. Had you any difficulty in making that trip?—None whatever. I had made my arrangements in Calcutta. I had made up a tent at Calcutta, and a tuck-too van or litter.

1648. Was there plenty of water on the route?—We carried water from Calcutta, and we had Mocha water also with us, which is very good; we made tea of water of the wells of the Desert.

1649. Was it good water?—It was a little brackish or so, but it made very good tea, we thought.

1650. How long did you stay in Egypt?—I was in Egypt about two months and a half.

1651. What detained you there so long?—I was detained about five or six weeks at Alexandria in consequence of my wife's confinement.

1652. Did you meet with many officers in Egypt who had come from India?—I met a great many officers and mercantile gentlemen who had come from India.

1653. What might be the number of officers, civil and military?—There were, I should think, about 25, and five or six merchants, I should think.

1654. What was the opinion of those officers respecting the convenience of the route through Egypt?—They were of opinion it was quite practicable, indeed that it was perfectly easy, and they were highly delighted with their trip, and much pleased with the ruins of Egypt, and other objects of interest which they had seen both in Arabia and going down the Nile.

1655. And was it the general opinion that this would become a favourite route between India and Europe?—Decidedly; I never heard any objection to it stated of any kind; any person who has ever gone that route would never go round by the Cape of Good Hope.

1656. Were there other travellers in Egypt from Europe or from other parts of the world except England?—I met a French viscount and a Swedish captain of engineers and several Americans, and a good many Englishmen of fortune travelling for their pleasure.

1657. Did any of them express a desire to avail themselves of a steam communication to go to India?—All that I had any conversation with on the subject, and I had conversations with several, both English and Americans, and they stated that they were exceedingly anxious to go and see India; and one family in particular, an American family that I met at Thebes, said they would have gone in the Hugh Lindsay the next trip, were they not afraid of arriving at Bombay at the commencement of the rainy season, when they were afraid it would be impracticable to travel over land from Bombay to Calcutta, but if steam communication had been established between Bombay and Calcutta round Ceylon, that they would have had no hesitation in going.

1658. Now, of those officers that came to India, what proportion of them, as well as you can judge, intended to go to England by sea, and what proportion across the continent?—I take the number at 25 who came overland about the same time as I did; of these, I should say 20 went over to Sicily, and thence through Italy home, and that five went in the Falmouth packet direct to England.

1659. Are you enabled to give any opinion as to the comparative expense of a voyage coming by Egypt, and of a voyage out by the Cape of Good Hope?—I should think that the expense of a voyage up the Red Sea would be much less; if I might take my own case, I paid much less for my trip than I could have been able to get a passage for from Calcutta to England in a good sailing vessel round the Cape of Good Hope; but I came in country vessels, and they are much cheaper than I imagine steamers would be; but I should say, if the passage from Calcutta to Suez was made about 50 *l.* or 60 *l.*, that an officer of moderate means might be able to reach England as cheaply as by the Cape of Good Hope, and that even if they could not do it so cheaply, that 90 out of 100 would prefer going that route, although a little more expensive, on account of the objects of interest which would attract their notice.

1660. Mr. *Barclay.*] And the saving of time probably?—And the saving of time also.

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1661. *Chairman.*] You found in your own case it was cheaper to come by the Red Sea?—I did.

1662. Have you any objection to state the particulars?—Not the least; I went in a native Indian vessel, entirely manned by natives, though commanded by an European captain, and I paid for my passage for myself, my wife and child, and had an excellent poop-cabin, 800 rupees to Jidda; I waited three weeks at Jidda, and got into the same ship and went up to Cosseir in Egypt in her, and I gave 12 *l.* more for my passage, with the same cabin; I think from Calcutta to Geneva, including my expenses at Cairo and Alexandria, and staying in the Lazaretto in Malta, and staying many days at Naples and Florence, and other towns of Italy, that I reached Geneva with an outlay of rather more than 200 *l.*; I mention Geneva, because I got a remittance there from England, as my whole Indian finances were exhausted by the time I got there: there can be no mistake about that, for I had but a certain sum to take me from Calcutta, and I had spent that as I went along, and I knew what I took away with me.

1663. What would the voyage by sea have cost you round the Cape?—I do not think I could have got a comfortable cabin in a good ship, with a good commander, under 300 *l.*; in a common ship I might have got one for 250 *l.*, I dare say.

1664. You were some time both in Mocha and Jidda?—I was a few days at Mocha, and three weeks at Jidda.

1665. How did they appear to you adapted for coal depôts?—I think Jidda is admirably adapted for a coal depôt: a beautiful harbour, as smooth as a mill-pond when you are inside; there is very good anchorage, and it is very capacious; and Mocha, again, is an open roadstead, where the south-east monsoon blows with constant violence, but I do not think it ever blows in squalls or hurricanes there, so that the anchorage is comparatively safe, and if you should happen to break from your moorings, why you would only be driven out to sea, nine months in the year, for the other three months it blows in-shore; it is not certainly such a good depôt as Jidda is, on that account.

1666. You did not stop at Camaran?—I did not stop at Camaran.

1667. Mr. *Mullins.*] Did you make any inquiries respecting it while you were on your passage?—Yes; I heard a great many opinions on the subject; I had a great deal of intercourse with naval officers on the Red Sea, and I think the general opinion was that Camaran was well adapted for a depôt, having a good harbour, though perhaps not a sufficient quantity of water over the bar at all times of the tide for large vessels, but they seemed to think quite sufficient for a steamer.

1668. *Chairman.*] Did you hear how far the Pacha of Egypt was favourable to steam navigation?—Yes; I had a good deal of intercourse during my stay at Alexandria, both with influential Turks and with British and Foreign merchants there, and they were particularly well acquainted, several of them, with Mohamed Ali's sentiments, and seemed to think he was highly favourable to the establishment of a steam communication, and seemed to think he was equally anxious for it as the English themselves, because he imagined that the establishment of it would divert a certain portion of the trade from the route of the Cape of Good Hope to its ancient channel of the Red Sea, and that he would be a gainer by his revenue being increased, and by his putting a slight transit duty on the trade, and it would greatly add also to the political importance of his country; and another object of it would be, that it would tend to cement a stronger alliance between Great Britain and Egypt

1669. And the merchants that you saw there, did they entertain the same opinion, that commercial intercourse would be increased and benefited by it?—Decidedly; they look on the establishment of steam communication with as much interest as the people of India do, and they think it will greatly increase their trade and commerce; that it will bring many things from India to Egypt which do not come now, and many things from Arabia, such as coffee and senna; and they seemed also to think it would be the channel for the conveyance of the trade of Turkey to India and China.

1670. Were any other articles specified?—Valuable goods which can be compressed into a small space, such as silks, stuffs of India and China, and Cashmere shawls and precious stones; and they seemed to think that a good deal of indigo, which is a valuable commodity also, would eventually come that way, particularly if that Prince establishes his railroad between Suez and Cairo.

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1671. How far is the Pacha of Egypt in possession of both sides of the Red Sea; have you any information upon that point?—Yes: the Pacha of Egypt possesses the whole coast of the Red Sea from Suez, on the north, to Mocha, on the Arabian shore, on the south, and to Suakin, on the African shore; he has an army of about 20,000 men in Arabia, and the chief towns on both coasts are garrisoned by his troops, with a regular government establishment, civil and military; and from what I saw of those governors, and the different civil and military officers, on my route up to the Red Sea, I should say that they are highly favourable to the English and to English interests, and are most willing in every way to forward the cause of steam navigation, for the transit either of despatches or of British travellers. I received myself the greatest civility and attention from them, and had frequent audiences with them at most of the towns I stopped at.

1672. Then you consider the intercourse completely secure through Egypt, both by the Red Sea and over land?—Quite so; I think perfectly secure.

1673. Now, do you happen to know in what manner the Pacha removes his troops from the Nile to the Red Sea; by what route, and in what manner?—He sends them sometimes up the Nile in boats to Gennah and across the Desert to Cosseir, where they are embarked in Arab buggaros, and in these they are conveyed to Yambo, Jidda, Gonfodah, Mocha, &c.: others who have been in Syria, or who are in garrison at Alexandria and at Cairo, are sent across the Desert to Suez direct, the nearest route, and thence shipped in buggaros and go down the Red Sea, the same way as others do from Cosseir.

1674. Do they march across?—They march across.

1675. How are they supplied with water?—They generally carry Nile water in bags with them on camels. There is never the least difficulty about water: for culinary purposes they make use of the water of the Desert, and for drinking they carry Nile water, which is very sweet water, and will keep a long time.

1676. Had you any apprehension of the plague during your residence in Egypt?—No, I never had any great apprehension, although it was raging almost the whole time I was in Egypt. We first came upon it at the large town of Siout, the capital of Upper Egypt, beyond which limit it seldom extends; it has never been heard of at Thebes; and it accompanied us all the way down the river, on both banks, and the only precaution I ever took was, that when I got alongside of a boat containing the dead bodies of people who had died of the plague, which I did accidentally one day, when I got alongside of one with 17 plague bodies on board of it; they had come over for interment; they generally inter their bodies there in the Desert that they may not cut up the fertile cultivated soil; in fact, bodies during the inundation would be washed up if they did not bury them out of the reach of the inundation; the only precaution I took upon that occasion was to fumigate the boat well in case of anything happening, as I had the lady and a child on board, which made me more particular than I otherwise should have been; but during the whole time of my progress down the Nile from Siout to Alexandria, where the plague was raging, I never kept any quarantine; and I freely went into all the villages and among all the ruins to see all the celebrated sights; I have had several of my boatmen ill from fever, but none of them ever caught it, and we arrived in safety at Alexandria; and I believe if you are confident you will not catch the plague, and do not harbour any fears about it, you are not so likely to catch it as you would otherwise be.

1677. And on the part of the other officers you met there, was there any serious apprehension?—I do not think there was much apprehension; we are so much accustomed in India to violent epidemic diseases, such as the cholera and those things, carrying off hundreds before our eyes, that we think less of it than other people.

1678. Then you do not think that the existence of the plague in India can be considered as a serious interruption to intercourse?—No, I do not.

1679. Can you speak as to the general desire of the civil and military officers in Bengal for the establishment of this steam communication?—Yes, I can speak confidently of the general feeling in its favour among the civil and military servants; they are most anxious to have it established, and indeed they have made great exertions, and several of them have subscribed considerable sums to forward the cause; I myself have subscribed twice for it.

1680. And

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1680. And do they wish it for the sake of the quicker correspondence, or for the sake of the passage home?—Partly for both; I think there is no doubt their first object is to secure a certain and rapid correspondence, but their second object is to avail themselves of a quicker passage to England.

1681. Mr. *Mullins.*] Do you think the rates charged by the Cape of Good Hope for passengers from this country to India ought to be persevered in, the charge for passengers from this country through the Mediterranean to India, or whether they should be raised or lowered?—I should think the community of India would bear to have them rather raised a little than otherwise, but they would willingly pay an extra sum of money for the facility and for the greater rapidity of transit; and I think they would pay the same, because they would be fully remunerated by the objects of interest which they would see in Egypt and on the continent of Europe.

1682. But the chief inducement, you think, would be the facility of communication?—That would be one, but I think the other also; it was a great inducement to me; I speak personally; I thought the seeing of those monuments of antiquity in foreign countries a great object, and it would be a great object with most Indian officers.

1683. Do you think it would be an inducement to those officers who are now in the habit of going to the Cape of Good Hope on a certain portion of their allowance to come to England by the Mediterranean, even though they should lose that allowance?—They can go now to the Cape of Good Hope retaining their allowance; they can go to Egypt also retaining their allowance; therefore I think that if the offer was made to them whether they would go on sick leave to the Cape of Good Hope to spend a year or two, or whether they would go to Egypt, they would say, "we will go to Egypt at once," because it is a far more interesting country, and a more delightful climate; and they can not only go to Egypt and wander about, but they can go to Syria, and I do not know whether they cannot even go to Constantinople.

1684. Do you think it would be advisable to make an arrangement by which they might continue their progress to England instead of remaining in Egypt, by diminishing still more the allowance which they at present receive by going to the Cape of Good Hope?—Do you mean that they now receive?

1685. Yes; if that allowance were still further diminished, should you think it advisable to permit them to come to England for a certain time, in place of remaining in Egypt, which at present they have it in their power to do?—I think if they put them on English pay and English allowance, that every one of them would be induced to come to England instead of remaining either at the Cape of Good Hope or in Egypt; but it is the loss of allowance that induces them to stop at the Cape, or would induce others if steam communication were carried into effect to remain in Egypt.

1686. But even though there should be that loss of allowance, would not the facility of communication be an encouragement to those invalids to come to England in preference to staying in Egypt, even though they should lose their allowance?—I think a great many more would come to England than do now, decidedly; but those who have staff appointments in India, either in the civil or in the military service, these are the people that do not like to sacrifice their appointments by making those who have no appointments or who merely belong to the regiment; these people would all prefer coming to England instead of staying either at Egypt or at the Cape of Good Hope.

1687. But you do not think the possibility of reaching England within a certain period after leaving India would be an encouragement to officers such as you describe, who have large allowances, to make a temporary sacrifice, for the purpose of seeing their friends at home?—If it were only a temporary sacrifice they would all do it; but on leaving India, an officer who has an appointment forfeits that appointment, and therefore if he goes to England only for six months when he returns to India he must rejoin his regiment.

1688. Your opinion then is, that it would be matter of good policy to give the same privileges to Indian officers coming to England that they at present possess going to Egypt or the Cape of Good Hope?—With regard to retaining their appointments and allowances.

1689. And being reinstated on their return?—There would be a good deal of objection on the part of the officers of the Indian army to such an arrangement, for this reason, that when an officer goes home, some candidate succeeds to the vacant

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vacant appointment, and then it creates a greater falling in and a greater number of appointments, and if they were deprived of this, they would be inclined to grumble perhaps, although no doubt it would be for their own advantage, in my opinion, because there would be a greater number of acting appointments, a greater number of officers in staff situations; some have been 50 years nearly in staff situations, and never quitted them. These men would go home, and other people would be appointed to act in their room, and therefore it would, I conceive, be a great advantage to the Indian army if they were allowed to come home, retaining their appointments.

John Kingston, Esq., called in; and Examined.

J. Kingston, Esq.

1690. Mr. *Mullins*.] YOU are one of the engineers to the Admiralty?—I am assistant engineer at the Woolwich yard.

1691. You, of course, from the nature of your duty, have been obliged to devote a great deal of attention to steam machinery, and its various improvements in steam vessels?—Yes.

1692. How long have you been appointed to that office?—I have been there 17 years, but not all the time performing the same duty.

1693. How long have you been performing the duty you now perform?—About 12 years.

1694. In the course of your duties you have had occasion, under the orders of the Lords of the Admiralty, to examine different improvements in steam engines?—Yes.

1695. I perceive that you and Mr. Lloyd have made a report to the Lords of the Admiralty, in the year 1834, with regard to Mr. Samuel Hall's condensers?—Yes, we did.

1696. You were directed, I believe, by the Lords of the Admiralty to go on board a vessel for that purpose?—To make an experiment to Ramsgate and back.

1697. Will you have the goodness to state to the Committee what opinion you formed of that experiment? At that time I formed a good opinion, and I still hold it; but I understand it has been taken out of the vessel; I do not know from what cause. The only objection was, that the pipes were liable to choke.

1698. What pipes?—The pipes forming the condensers; several vessels are furnished with them in Scotland, and I believe they answer well, from what I hear there.

1699. Mr. *Barclay*.] In what way do they answer well?—The saving of the boiler is the principal, to prevent any deposit from sea-water; no sea-water goes in the boiler, the water being continually used, over and over again, is condensed.

1700. Mr. *Mullins*.] Will you state, for the information of the Committee, what the peculiar principle is, and how it is applied?—At this moment I do not exactly recollect the form of it.

1701. But you can state generally what the principle is?—It is a number of pipes, I forget how many there are in number, and the steam passes through those pipes; there is cold water, of course, round them continually; the steam is collected, afterwards condensed, thrown back again into the boiler, and then it is re-used.

1702. So that there is a total impossibility of any deposit?—Quite so.

1703. Or incrustation being formed in the boiler?—Quite so; it cannot be, the time this water goes in the perfect state it does.

1704. When the water is first introduced it is distilled water?—No, common water.

1705. Not containing any salt?—No.

1706. And then it is distilled water which is introduced afterwards to keep up a supply?—It is. There is only a small quantity; that will depend on the leaks. They take a very small quantity to sea with them to make up the defects.

1707. In your opinion, how much longer will a boiler last in which the principle of condensing by surface is applied than a boiler on the common principle, where there is a condensation by injection?—I should venture to say three times as long, at any rate.

1708. Where those condensers are applied, what description of boiler would you use, copper or iron?—I should say iron boilers.

1709. Do you think it would be necessary to construct the boiler of such large proportions when those condensers are used as under the common plan?—I should think it would require no difference as to size; I do not see why it should.

1710. Are you not aware that in the construction of the boilers in general use they make a certain allowance for the incrustation, and for the necessity of having a greater surface to obtain the requisite quantity of heat?—I have never understood that to be the case.

1711. With regard to the quantity of consumption of fuel, have you formed any opinion upon that subject when Hall's condensers are used?—There is a saving of fuel, I think, but it is principally the saving of the boiler.

1712. Are you aware that in your report to the Lords of the Admiralty, you decidedly stated there was a saving of fuel?—The saving of fuel must be taken in this way, when the boiler becomes so lined with this filth that it requires a great quantity of heat to generate the steam in sufficient quantities.

1713. But when it is evident that according to the old system there must be incrustations of boilers, and therefore an additional quantity of fuel, and when in the new system the boiler is kept perfectly clean, is it not your opinion that there must be a saving of fuel under the latter circumstances?—Quite so.

1714. There is also another reason why there would be a saving of fuel, which is the avoidance of the necessity of continual blowing off?—That is another point, certainly; there is no blowing off required. In the common boiler they blow off every two hours, with the injection condenser they blow off every two hours.

1715. When the new condensers are applied it is not necessary?—No; you must not blow off.

1716. I believe you have found in the same way that many engineers who have devoted themselves to that subject, that in proportion as the incrustation or deposit in boilers increases, so does the quantity of fuel, used in a certain space of time, increase?—Certainly it does; I cannot speak exactly to what quantity it does increase, but I know there is a very great increase; at the expiration of two years the boilers require a great deal of fuel: there are some parts that you cannot get at to clean.

1717. So that in case of a vessel making a passage of several days, you are aware it has been found that, at the termination of her passage, she consumes a much greater quantity of fuel than at the commencement?—Yes; and the rapid destruction of the boiler goes on in the first place.

1718. Mr. *Barclay*.] Are these condensers very much used now in the construction of new steam vessels?—We have one making, the Margara, for the service.

1719. But I mean the general service of the country?—Principally in Scotland: I have no knowledge of having them, except I think in three Scotch boats; the Prince Llewellyn is one.

1720. Mr. *Mullins*.] If you look at your report, you will see the St. George's Companies, every one of them, has them [*The Witness looked at the Report*]?—I was not aware there were so many as those.

1721. How many vessels are there stated there to be actually in action?—There are eight vessels actually in action, and there are 21 vessels constructing upon that principle.

1722. And do you happen to know they are applied in a vessel going between this country and America, the British and American Steam Navigation Communication, Claud, Girdwood & Co., 460-horse power?—Yes, I heard of that.

1723. Did you pay particular attention to the action of the machinery during the passage to Ramsgate?—As far as outward appearance would allow us to do so. The condenser was not opened for us to look at the internal part of it.

1724. Were you able to form any opinion as to the increase of speed?—We did not make any trial of that kind; although we passed our mile-mark we could not attend to it, in consequence of the passengers being on board; she was loaded with passengers; besides, to make a trial of that kind we should make a comparison.

1725. Do you think that a more perfect vacuum is preserved in those condensers?—It appeared so by Mr Hall's statement; there was no barometer on.

1726. But you have always understood that the vacuum was better preserved in

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in those condensers?—I have always understood so, and I believe it to be the case.

1727. You are aware that it is proposed to open a communication between this country and India; do you suppose that, for the long passage that the vessels would have to make on that route it would be advisable to apply those condensers?—I should have no fear to try one as an experiment, none whatever.

1728. Do you not suppose that the experiment has been sufficiently tried already where vessels have been fitted with those boilers, and have been working for a number of years, as in the case of the Hercules, for instance?—The Hercules has been working, I think, two years. I should rather try them a little further first.

1729. Have you heard any report of the working of the engines of the Hercules?—I was to have attended a trial as much as six weeks ago, only I was ordered off to another place. Mr. Ewart and his assistant tried the Hercules, but I have not heard their opinion upon the condensers at all.

1730. You are aware that those boilers do not require examination or cleaning for a very long period?—I have heard so; I have not seen it myself.

1731. Do you know anything of Morgan's paddle-wheels?—Yes.

1732. What is your opinion of those paddle-wheels for vessels which are intended to make long voyages?—I would not recommend them.

1733. Will you state your reasons?—The principle of the wheel is good, but they wear out so very fast that they would not run, I should suppose, more than from 22 months to two years without repairs. I have had a great deal to do with them; as much as any one.

1734. They have been tried in the vessels of the service, have they not?—We have several vessels fitted with them now. We took them from one vessel last week, the Tartara, I think; they had been in only 14 months, and they wanted thorough repair.

1735. And therefore your opinion is, that where it may be difficult to obtain those necessary repairs it would not be advisable to apply such a complicated system?—Just so; I am perfectly satisfied of that.

1736. And you do not know any other description of paddle-wheel in present use which it would be proper to recommend for such vessels?—We are making trial of Mr. Field's wheel, a cycloid wheel, on Mr. Field's plan; Mr. Galloway claims it, but Mr. Field I know is making some excellent experiments, and if it succeeds in sea as it does in still water, it will be the best wheel that was ever made or thought of.

1737. Describe the principle of it?—It is a wheel, differing in no other way from the common wheel except that there is a double set of boards, not a plain rectangle, but the board is taken off, and it is brought as it were in a parallel position, with an interval between the edges; we have only two-thirds area of board on the wheel we are now trying, and there is an advantage in point of speed over the whole board; I cannot account for it; it will require some consideration.

1738. In those wheels you have just been describing, there is nothing so complicated in your opinion as to prevent their being applied, in case they should be found to answer, as well in rough water as in smooth?—Nothing to prevent them whatever; they are simple, durable, and possess all advantages if they should succeed in the sea.

1739. I understood you to state you are making those experiments under the orders of the Lords of the Admiralty?—We are; we have made 16; to-day is the 17th; I have only been present at four, because I have been to Scotland.

1740. You of course have examined the different sizes and proportions of vessels for the different situations on which they may be placed?—Yes.

1741. Is it your opinion that in the case of vessels intended for making long voyages and encountering hard weather it would be advisable to have a large tonnage and great horse power, or to limit it to such a size as that of the Atalanta or the Berenice?—I think vessels from 450 to 600 tons is about the size that I should recommend; not larger than 600 tons.

1742. Will you state your reasons for limiting the size of vessels to that particular tonnage?—I think they would be more suitable for the distance they have to run.

1743. Are you aware of the distance they would have to run?—I should suppose not more than eight or nine days each.

1744. Do

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1744. Do you think a vessel of that size, with a proportionate horse power, could weather a gale better than a vessel of a larger tonnage and a greater horse power?—I think so.

1745. And is it your opinion there will be as little wear and tear of the vessel, or straining of the vessel and of the machinery?—I should think there would be less straining of a vessel of that size than one of much larger dimensions, especially crossing a heavy sea.

1746. Is it your opinion that a vessel of that size could make any head-way against a heavy sea?—With plenty of power; I would not confine her to power.

1747. What proportion of power would you give a vessel of 600 tons?—I would not give her less than 270-horse power; from 260 to 270; not less.

1748. Are you not aware that if you put more than a certain horse power into a vessel of a certain tonnage, that in attempting to make head-way against a heavy sea, she would actually strain herself under the water, and that consequently that additional horse power would be useless to her, inasmuch as she could not use it?—I think that would depend, in a great measure, upon the form of the vessel.

1749. Can you conceive any form of vessel, or do you know any vessel having such a form as to enable her to use that horse power, or that proportion of horse power that you describe, without incurring such danger as I mentioned, if put to her speed?—The Unicorn, that runs from Liverpool to Glasgow, has similar power, as near as possible, to the tonnage of the vessel; she has 240-horse power, and I think she is not more than 250 tons; and I examined a vessel, called the   , which the Government have bought lately. She has engines 290-horse power, and her tonnage is 562 by the old measurement, and by the new rules 711 and some odd fraction.

1750. Do you know of any other instance besides those you have mentioned?—The Eagle is a similar vessel to the Unicorn; the power is the same. I think, in a great measure, it depends on the form; but whether or not, if you have an excess of power in a vessel, you have no occasion to make use of it unless you please; you may reduce your power as much as you please. It is best to have it, because in quiet, still weather you have all the advantages, and those advantages tend to the saving of fuel.

1751. Looking to the increase of weight which must necessarily attend an increase of power in the engines, do you think any advantage to be gained will not be counterbalanced by many disadvantages, such as the displacement of a certain number of tons of cargo?—The engines will take a little more room than engines of less power, say 40 horse less.

1752. But then there are the boilers?—The boiler is the only thing, but that is no great deal; two feet in a boiler is not a great deal; you would have the advantage of your power when circumstances would allow it.

1753. There would be some additional space taken up by the boilers and the machinery?—But the extra power would be available in fair weather.

1754. You are aware that vessels of 1,000 tons and 250-horse power have been recommended by Dr. Lardner, and different other gentlemen, and why is it do you think there will be any advantage arising from the employment of vessels of such a size in preference to those you have spoken of?—I should not think there would be any advantage at all, but a very great drawback.

1755. You are aware that those vessels are proposed to carry passengers, and also to carry a certain number of tons of cargo; do you suppose that in a vessel, such as you describe (a vessel of 600 tons), there could be sufficient accommodation for a number of passengers, and also to have spare room for a cargo, consistently with the quantity of fuel which it would be necessary to take for a long voyage?—That is to say, for nine days; I believe that is the longest.

1756. But then you must allow for accidents?—We always have an excess of two days, eleven days for nine days; I think you might conveniently stow about 60 passengers abaft.

1757. With perfect accommodation and comfort?—Yes, I do; and 25 forward.

1758. What space could be spared for general cargo over and above the quantity of luggage that belong to the passengers?—There would not be a great deal of room I think for cargo, but I cannot speak positively to that; I will, however, if the Committee wish it, make the best calculation I can upon that subject and furnish the Committee with it.

[*The Witness was requested to do so.*]

Martis, 11° *die Julii*, 1837.

MEMBERS PRESENT.

Mr. David Barclay.	Mr. Hutt.
Lord William Bentinck.	Mr. Mullins.
Sir John Hobhouse.	

LORD WILLIAM BENTINCK, IN THE CHAIR.

Captain *Robert Oliver*, R.N., called in; and Examined.

Captain R. Oliver, R

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1759. *Chairman.*] DO you belong to Her Majesty's Navy?—I do.

1760. What rank do you hold in Her Majesty's navy?—Captain.

1761. How long have you been a captain?—Commander and captain near 10 years.

1762. You have been during that time in command of steamers, have you not?—I have been for the last six years attached to the steamers. I commanded the Dee and the Phœnix, and was interested in other vessels.

1763. What are the power and tonnage of the Dee and the Phœnix?—The Dee is 704 tons, and 200-horse power; the Phœnix is 809 tons, and 220-horse power, the same as the other large class; that is the maximum power afloat at present; the same as the Salamander, the Rhadamanthus and Medea.

1764. Do you consider that proportion of power equal to the tonnage, or that it would be better if it was increased?—It depends entirely upon the purpose for which it is employed; in large vessels the power is not increased in the same ratio with the tonnage.

1765. That is to say, a greater tonnage requires less power in proportion?—Yes; we find that the large vessels make better progress with smaller power than smaller vessels do, from their own gravity.

1766. Dr. Lardner, the other day, informed the Committee that the larger the vessel, the more easy it was to overcome resistance; you agree in that opinion?—Perfectly.

1767. He gave that as his opinion, and he referred particularly to the Medea, that a vessel of 1,000 tons, intended for a lengthened steam navigation, would do better, upon the average, with one-fourth of the power, that is, with 250-horse power, than if it was increased much beyond that?—I have found that to be so. My experience leads me to believe that to be the case.

1768. He gave this as a reason, that in smooth water the greater power would propel the vessel with greater speed; but if they have to overcome an adverse sea and bad weather, the larger the vessel the greater the speed?—Yes, from the gravity of the vessel; that I have found in my own experience. In commanding the Dee, for instance, of 200-horse power and 704 tons; in the Phœnix, 809 tons, with only 20-horse power more, I could face the sea, and make progress much easier with that vessel; and I am perfectly satisfied that that principle is good throughout, that the larger the vessel the greater her capacity to resist both wind and sea, and a less engine is required to propel her.

1769. In India, where we have to contend with the south-west monsoon, that principle would be particularly applicable, would it not?—Quite so. I should recommend vessels of a larger class than are usually employed.

1770. What would you recommend, from your experience?—I should say a vessel of from 900 to 1,000 tons, not less.

1771. With what power?—I would say about four tons to a horse power; in vessels of a smaller description the load is equal, but she has less capability of bearing it; consequently, much power is lost in overcoming the resistance from immersion.

1772. Have you been off the coast of Spain?—I have been no further than Lisbon.

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1773. Have you ever carried troops in a steamer?—Occasionally; not for any distance. The ship I commanded I was absent from at the time she carried troops to Ireland. I have had troops on board for short runs, and at anchor I have had a considerable number on board.

1774. Are any Government steamers fitted up for the express purpose of carrying troops?—There is only one for dock-yard purposes and conveying troops.

1775. What description of vessel is she?—She is about 700 tons, and 200-horse power, similar to the Dee.

1776. Do you know what troops she will convey?—It depends entirely upon the season, distance and the kind of weather; but in fine weather she would take 500 men upon her decks, with great ease, for 24 hours; and she would tow at the same time a transport with an equal number. I conceive one of those vessels would take a whole regiment, with a transport in tow, only to be limited by the fuel and provisions.

1777-8. It would be a great advantage in India, with our extensive coast, and an adverse monsoon one way or another, to have steamers that would convey bodies of troops from one point to another quickly; what description of vessel do you think would best attain that object?—The very largest class; the larger the greater the accommodation in proportion to the tonnage.

1779. Do you think the object would be attained by having the steamer work as a tug?—She might take a greater proportion herself; she might take 500 men upon her decks, with great ease, for many hours, depending entirely upon the weather.

1780. Supposing the troops were required to be carried several hundred miles, and to occupy six or seven days' passage?—There would be no difficulty in that.

1781. In India you would require that the troops should be protected from the sun?—We have no means of stowing them in our ships below: the accommodation below is very trifling. The engine-room occupies so much of the space, there is not much accommodation for them below, but they must be protected by awnings.

1782. The steam vessels on the coast of Spain have been used entirely for purposes of war, not for conveying troops yet?—The Phœnix and Salamander took 1,200 men, who were the means of turning the day; they made a breach, as I was assured by an officer present, where 200 men could walk in; that was effected by the Phœnix alone.

1783. Are you acquainted with the Medea?—Perfectly.

1784. She is made for sailing as well as steaming?—All the Queen's steam vessels are rigged to make a voyage entirely under sail; by disconnecting the wheels we save our fuel, and make as good voyages, with a free wind, as any sailing ship, provided the wind is not too light; then, if the wind is so light that she does not make her maximum speed under sail, we then apply a portion of the power, either by one wheel or two wheels, or one boiler or two boilers, economizing the fuel to the demand for speed.

1785. Has she a different construction for the purpose of adapting herself to the double service of sailing and steaming?—No; only the masting and rigging is in better proportion. Throughout the service an arrangement has been made, to adapt all steam vessels to make their passage under sail alone.

1786. The masts and yards are heavier than they would be in one of the Navigation Company's vessels, are they not?—Yes, they are on a very large scale in proportion, but not sufficient to cause too great a resistance; they are constructed on the principle of giving the greatest spread of canvass with the least possible resistance from the masts and yards. The topmast and yards, and everything comes down, and there is nothing but the lower masts offering resistance.

1787. Then the different rigging does not interfere with the power of the vessel as a steamer?—No: the Medea has been cruising for weeks together with a fleet, without ever getting her steam up; and she will, with a strong

der double-

eight knots

r, equal to

that of the dullest ships; off the wind, so long as a larger ship is compelled to reduce her sail, she comes on an equality with them.

1788. Mr. *Mullins.*] Have you any notion how many knots an hour the Medea makes when steaming, in average weather, at sea?—It depends a great deal upon her trim, whether she is very deep or very light.

1789. The question assumes that she is in good trim?—Then, in moderate weather, she would make nine and a half in smooth water.

1790. Take the case of the weather the vessel is accustomed to meet with at sea most parts of the year?—She averaged better than eight knots an hour in her passage from England to Malta.

1791. *Chairman.*] How many days' fuel will she carry?—She has carried 320 tons; they used great economy: much depends upon the mode of management.

1792. What does she consume per day?—About 18 tons a day, taking the average; she can carry 18 days' consumption with great ease.

1793. Mr. *Mullins.*] In a vessel carrying so many days' fuel, how many tons would be spared for a cargo, assuming her to take a cargo, without sinking her too much?—There would be very little room for a cargo.

1794. Assuming her to be carrying coals for 18 days, and the consumption to be 18 tons per day, what do you think would be the number of spare tons for cargo such a vessel could afford?—It would be about 72 tons; the only difference between the 12 days and the 16 or 18 days would be, her lines would be so deep, if she was lower it would be against her going.

1795. That tonnage, with a cargo, would not, in your opinion, throw her out of proper trim, or cause her to sink too deep?—She would be quite deep enough. It is the immersion of the vessel by which her speed is regulated; it is by immersing the ships in the way they do that they make such little progress in bad weather.

1796. Do you suppose a vessel will be immersed too much if she was to take that quantity of cargo you have just mentioned, in addition to the fuel necessary for 12 days?—Yes, too much for bad weather. The Medea, in addition to her full complement of coals, carries 120 men, with three months' provisions; her armament and ordnance stores are near 25 tons; all her duplicate engine gear, the weight of which I have not the means of giving, but which is very extensive, say 10 tons, and all other stores usual in vessels of war, which amount to a very large quantity.

1797. Is it your opinion, that with all those different armaments which a vessel prepared as a vessel of war must take, she still would take that quantity without being immersed too deeply to injure her working in bad weather?—That ship would perform her duty well, she has done it; but in extreme bad weather she would find an inconvenience.

1798. Assuming a vessel of 1,000 tons and 250-horse power to be confined exclusively to the conveyance of passengers and to the conveyance of a general cargo, assuming her also to take fuel sufficient for 12 days' steaming only, how much room, in your opinion, would she have for a general cargo?—Not much more than the other ships I have already mentioned of 220-horse power; in the same proportion.

1799. In what respect, under those circumstances, would a larger vessel have an advantage over those you have been describing?—Her superior capacity gives her superior power, the larger the vessel the greater the capacity of carrying sail; in long voyages, the sail must assist very materially; those ships will make a four-point course good. When a vessel does not make more than five or six knots direct to windward, it is better to put her under low canvass, when she will increase her speed one-third; and by working a traverse, she will arrive at her destination in nearly equal time; with the wind fair, she is quite capable of making her passage with her wheels disconnected, thereby saving her fuel altogether. I have prepared a scale, which, with the permission of the Committee, I will put in.

[*The same was delivered in, and is as follows:*]

The

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The accompanying Diagram shows the advantage of the efficient masting and use of sails, when the speed reduced to and below five knots from resistance of head sea and wind, it having been found with steam, and fore-and-aft sails, a four-point course can be made good with an increase of speed of from one-third and upwards, according to strength of sea; also, with the wind two points from the course by which the intermediate angles can be judged of.

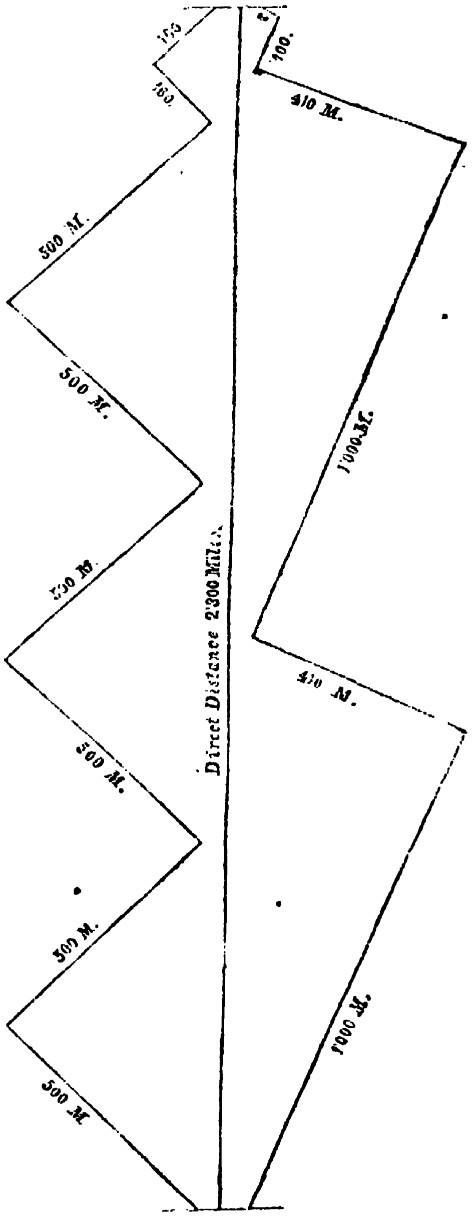
The Table an approximation to loss or gain in time.

It is rare, indeed, in a long run, but the wind veers so as to enable a greater advantage to be taken of the use of sails, and thereby relieve the vessel and engines considerably.

With the wind free, the velocity obtained from the sails frequently exceeding that of the engines, by disconnecting the wheels, the expense of fuel, wear and tear of engines and boilers is entirely saved.

Maximum Distance yet made under Steam, at one time, without a stop:

4 Points.
160
160
500
500
500
500
500
500
3,320



2 Points
40
110
410
1,000
410
1,000
2,960

Steam only:

			knots. hours.		knots. hours.		knots. hours.		knots. hours.
Direct distance	-	2,300 n. miles	- 5 in 460	-	6 in 383	-	7 in 328½	-	8 in 287
Steam and sail—Course of four points from direct line, the wind ahead:									
Distance run	- -	3,320 n. miles	- 7 in 474	-	8 in 415	-	9 in 368	-	10 in 332
Course, the wind two points from the direct line:									
Distance run	- -	2,960 n. miles	- 7 in 423	-	8 in 370	-	9 in 329	-	10 in 296

1800. Is it your opinion that the paddles could be unshipped occasionally, without any detriment to the strength of the machinery of the paddles by constant changing and re-changing?—We have two modes of proceeding, one to
disconnect

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disconnect the wheel from the engine and allow it to revolve, the other to displace a portion of the boards.

1801. You would not disturb the machinery of the paddle itself?—We do not disturb the segments or the arms.

1802. You do not think it advisable to disturb them?—No; for we have so short a time between port and port, there would not be time to ship them again.

1803. You do not think the skeleton-wheel would impede the vessel?—No, not more than an anchor-stock.

1804. Are you acquainted with any improvements which have been made of late in the steam machinery; do you know Hall's condenser?—I am not particularly acquainted with them; it is under trial, and as far as I have seen of it, it looks well.

1805. Have you heard that those condensers have been adopted on board one of the new large vessels building for a voyage to America?—They are about to do it, but the vessel is not yet built.

1806. Have you any knowledge of the working of those condensers on board the Hercules, which plies between London and Cork?—Only by conversation and hearsay.

1807. Have you heard that they answer the purpose?—So far as I have understood, they do; they have given satisfaction.

1808. Do you know anything of the recent improvement in paddles?—Morgan's are certainly superior in point of power to anything we have ever yet had.

1809. Have you heard that those paddles are much more liable to wear and injury than the common ones?—They are certainly more liable to injury, but they wear equally; very much depends upon the care.

1810. Do you not think that the difficulty of replacing them would be an objection to their use in an Indian climate?—Certainly; the Medea, Captain Austin, by her own means, without any extraneous assistance, in 13 or 14 working days, removed the paddles and replaced them by others, and had them ready for work. I conceive great improvements may yet be made in paddles; there is an experiment now going on at Woolwich, Mr. Field's improvement; they have reduced the boards very materially, and find that the vessel goes faster, and the minimum is not yet come to: those large boards are by no means necessary at sea. I have tried, to a limited extent, the experiment myself, and was going on with it by a reduction of the board, and I found a great advantage in it.

1811. Do you mean by new and improved paddles?—With the common radiating paddles.

1812. Field's, you have spoken of, are on a much simpler construction, much less liable to get out of order than Morgan's, are they not?—So many moving parts must be liable to wear and tear.

1813. What proportion ought to be the greatest width of the paddle, according to your opinion?—I cannot give a precise answer to that question; but I should say, generally, that all sea-going steam vessels are over-boarded.

1814. What immersion would you give the paddle-wheels of a vessel of the tonnage you have been describing?—One-sixth, I have understood to be the best mark.

1815. Do you suppose they should be deeper?—I would not immerse them more if I could avoid it, but they are unfortunately compelled to do so; by increasing the power, they get into the difficulty of immersing the boards, which is the reason in a great measure that light power acts better than heavy power; a ship may be over-powered.

1816. In the vessels which you commanded, what description of coal were you in the habit of using?—The Welsh, the Llanally or Llangennech, we found most economical.

1817. Why is there greater economy in that description of coal than in any other?—We find great economy over the Scotch; I have placed it at one-fourth; I find a fourth difference in the consumption of the Welsh and the Scotch coal.

1818. There is other coal to be had in the different English ports, which, though not the coal you speak of, is still applicable to the purpose connected with steam, is it not?—We find other coal affect the boilers; the better the coal

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coal the greater the advantage to the boiler in every respect, and the less the consumption, and the injurious effect upon the boiler is less.

1819. Is there not a great deal of waste in the Llangennech or the Llanally coal, arising from the quantity of dust or small coal mixed with it?—A great deal; but it should be supplied hand-picked.

1820. Have you tried any other coal besides that you have named?—The Scotch coal my attention has not been particularly directed to; we have been mostly in the habit of using the Welsh coal.

1821. You have never commanded any steam vessel which has taken a cargo?—No, only a ship of war.

Captain *George Barnes Brucks*, called in; and Examined.

Capt. *G. B. Brucks*.

1822. *Chairman.*] YOU belong to the Indian navy?—I do.

1823. How long have you belonged to it?—I have been 31 years in India; five of them in His Majesty's navy, and 26 in the Indian navy, out of which period I have been 27 years constantly at sea.

1824. Are you acquainted with the Island of Socotra?—I have been at it, but of late, since it has been the subject of so much discussion, since the steam communication has been discussed, I have endeavoured to make myself acquainted with it by information also.

1825. Have you ever seen the survey of Messrs. Haines and Welstead?—Yes, I have.

1826. Having seen it, do you consider that that will make a very good depôt in both monsoons?—Yes, as far as anchorage goes.

1827. A doubt has been expressed as to the possibility of approaching it in the south-west monsoon; what is your opinion?—It is my opinion that if anchorage for a floating depôt (as the south-west monsoon would be the only period at which it was wanted) could be found under Cape Guardafui or Cape Felix, and I have reason to believe there is good anchorage under Cape Felix, coals in a floating depôt would much facilitate the vessels in the south-west monsoon, as in going up to Socotra at that season of the year they become exposed to the violence of the sea running out of the Gulf of Aden, which they would escape by keeping in with the African coast.

1828. You yourself have never been in either of those bays?—I have passed along the coast, but without anchoring. But there is one thing particular in this case necessary during the south-west monsoon, which I will state to the Committee: I have once beat up along that coast in a sailing ship, and as long as I could keep close to the shore, that is, within two, or three or four miles, I found smooth water, and a breeze varying from two or three knots to five or six per hour, but as you increase the distance to four or five miles from the shore, you get into the force of the monsoon; the chances are, in a sailing vessel at night you lose what you have gained by a good look-out in the day; in a steamer, from being able to keep a direct course along the shore, you might always keep in the smooth water, and consequently there would be none of the violence of the wind and sea felt.

1829. Supposing that there is not a good place for a depôt in those two bays, there would be no impossibility of going to Socotra?—Certainly not.

1830. What is your opinion of the ability of the Atalanta or Berenice making a voyage from Bombay to Socotra during the south-west monsoon?—I think it is perfectly practicable to make a direct passage, but still not advisable.

1831. For what reason?—Although the vessels would go across, they would strain their engines; the vessels themselves would also become much strained; but by continuing down on the plan which is now given in, they would make the passage in an equally short period, with not more than two-thirds of the expense of fuel, at the same time at an immense saving of wear and tear.

1832. How near to the Line do you go?—Within two or three degrees, according to where I may find the light winds.

1833. What would be the distance from Bombay according to that course?—Two thousand three hundred and thirty-five nautical miles.

1834. It is only occasionally that the south-west monsoon blows with great fury?—In the south-west monsoon, at times there is a lull, indeed almost approaching to a calm; but that is never to be depended upon, for though you may have it so within a few miles of the coast, or have it so at a distance off the

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coast, you will not find perhaps in any 150 miles during that line the same state of weather, neither can you depend upon the weather being the same for two days together.

1835. From what points does the wind blow in the south-west monsoon; the extreme points?—It may be taken at various periods of the monsoon; the early part of the monsoon, when it sets in on the western side of India, the wind blows in squalls from south-south-west round to about south-west-by-west. A month later, the squalls begin to get more westerly, till towards the month of August they very often blow as far round as west-by-north and west-north-west off shore; I have generally found the winds to hang with greater steadiness from west-south-west to south-west, and the squalls generally less violent.

1836. Have you been much in the Bay of Bengal?—I was cruising there during the years 1805, 1806, 1807 and 1808, and I was there employed on survey in 1814, 1815 and 1816, and I have made several passages round there since.

1837. What do you consider to be the practicability of making a voyage from Calcutta to Point de Galle to sail against the south-west monsoon?—I think it perfectly practicable.

1838. Is not the south-west monsoon as strong in the Bay of Bengal as it is between Socotra and Bombay?—At times I should say it was even more violent in the Bay of Bengal.

1839. Generally?—Generally; I should say it is more so on the western side of India, but they are much more liable to gales of wind on the bay than on the western side.

1840. Sir *John Hobhouse.*] But still there is nothing in the gales which you think a good steam-boat might not encounter?—As far as the gales go, I should think for the time they lasted that would generally put a stop to her progress; during the time the gales lasted in the bay she could not make way against them.

1841. You stated that those gales are more violent in the Bay of Bengal than in the Bombay seas?—I should certainly say so, but it is not to be supposed those are constant during the south-west monsoon; there may be two a year, or three, four or five of them; and in some monsoons, none of them.

1842. *Chairman.*] How would you make the passage down the Bay of Bengal against these monsoons?—I have found, at that season of the year, keeping nearer to the coasts of Oressa and Coromandel is by far the better than getting into the centre of the bay or near the eastern coast.

1843. The south-west monsoon does not as it were come home on the coast.—No.

1844. You do not apprehend there would be any difficulty in going to Point Palmyras when the south-west wind blows with great power?—In the end of August and the early part of September 1814, we were sent down through a freak of the Marine Board in Calcutta to survey Point Palmas: we had the full benefit on our way down of one gale of wind, and another after our anchorage in False Bay; still, in a sailing-vessel we made way against it: in this part you have the benefit of tides.

1845. You are acquainted with the Port of Galle?—I am.

1846. Do you consider that a good harbour for steamers?—It is according as the question is to be considered; if it is to be a place which is to be a sort of head-quarters for steamers, where repairs and such things are to be done, if a large expense of outlay were incurred and a pier erected, and the means of heaving-down vessels, and other very large expenses, then Galle would be fully efficient; but if it is only as a port for the steamers or a mere starting point which they are not to look to for repairs of any consequence more than their own people could do on board, I should say Galle is a very good place.

1847. Sir *J. Hobhouse.*] If it is to be made a place for repairing, or a depôt or station, you think a considerable outlay would be necessary, in order to qualify it for such a purpose?—It would be impossible to do without it in that case.

1848. Are you acquainted with Trincomalee?—I have been in the harbour; even there, though there is great facility in Trincomalee, from there being, I believe, a wharf to heave down ships, as I understand, no King's ships have been hove down there; it might be done at less expense; but then there is a great disadvantage attending that in the south-west monsoon; you have the full fury of the monsoon to contend against between that and Dondera-head. If

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I am asked the comparative advantage of the two stations, putting the outlay out of the question to fit the places, I should say that Galle was superior in every point.

1849. Without reference to the outlay, supposing that there was no consideration of the money to be applied in fitting either Trincomalee or Galle, you would prefer Galle as a station ?—Yes.

1850. Do you think there would be any difficulty in establishing regular steam navigation between Bombay, Galle and Socotra ? I consider that there is no difficulty. In the first place, in accomplishing a passage direct, the steamer can do that; but still, from the circumstance of the fuel, or strain of machinery, she might possibly break down, and there would be a greater expense of fuel; if she had the passage direct across to overcome, I propose that the vessel shall go about 218 or 220 miles off shore, south-west by west, leaving Bombay, by which means, with the prevailing winds, she would make a course, according to what I have seen myself of the winds, about S. by W. ½ W. to S.S.W.; I have allowed five points; they say a steamer will make a course good at four, till she came down to about two degrees and a half north of the Line; I would then, by going along 690 miles under steam, and, when practicable, sailing to the westward, which would be very near four degrees north; from that point they may put their fires out altogether, and get into the strength of the monsoon, and run up p. 166. the course as per Diagram, till they make the land a little below Cape Guardafui, then round that under steam they may go along the African coast, where they will find smooth water near the shore; if it was necessary for them to go up to Socotra the wind would help them on, but they must of course get under steam again when they left the island for the coast, but it would be but a short distance. In regard to the passage from Galle to Socotra, I should steer out from Galle, going through one of the channels of the Maldives.

1851. You would not go to the south of the Maldives ?—No, I should pass through with steam; I should then get the wind light, and have the full benefit of sailing, as before described in the Diagram.

1852. You think that, whether from Point de Galle to Socotra or from Bombay to Socotra, there are no difficulties, even in the south-west monsoon, which would prevent the permanent establishment of steam navigation by either of those routes ?—Certainly not. But I ought to mention, or it may be said I act inconsistently in India, as when I left India I was as great a bigot to the system laid down by Captain Wilson as any one knowing the seas could be, depending for information on Captain Wilson's report of the performances of the Hugh Lindsay; but since I came to England I have, under the sanction of the Court of Directors, made a point of going round in steam vessels to see what they would do, and I feel, from the experience I have gained, there is so little to prevent the constant communication being carried on, I should be quite ready to stake my professional reputation on the subject.

1853. *Chairman.*] Having, in India, entertained a different opinion ?—Yes, having had no information but that derived from Captain Wilson's pamphlet, and no knowledge but of the Hugh Lindsay, a very inferior vessel to most here.

1854. Sir *John Hobhouse.*] What sort of vessel would you recommend for the navigation of the seas of which you are speaking ?—I should say about 750 to 800 tons. In the south-west monsoon a large vessel becomes a matter of necessity. The vessel I should propose would not perhaps be quite so large as I have mentioned. I should propose a vessel of the same length of deck as the Berenice, but with an increase of beam. The Berenice is about 29 feet between the paddle-boxes, I believe. The beam between the paddle-boxes I consider should be about one-fifth of the length of the deck, or about 34 feet 8 inches; that of course would increase the tonnage in giving the dimensions. I suppose the Berenice to be 750 tons, but find she is under 700.

1855. Have you made any calculation of the time necessary to go from Point de Galle to Socotra ? I could make the passage from Point de Galle to Socotra in the south-west monsoon in about 15 days and a half, allowing the average of six miles an hour; about the same as from Bombay.

1856. *Chairman.*] What is the distance ?—The distance on the line I should say I should go over, is about 2,200 miles.

1857. Mr. *Mullins.*] At that rate it would be impossible for a vessel of the size of the Berenice to take coal sufficient to steam the whole way ?—In the plan I suggest they do not steam all the way; they have the benefit of their sails, for

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for a run of at least 700 miles; on the plan I have given, I should think, in a south-west monsoon, they might always calculate on 60 days at the outside from Bombay to England, and 56 days probably; the minimum out at this season would be from 44 to 50 days, I think, as average.

1858. *Chairman.*] You have served a great deal in the Persian Gulf?—I have, and I have surveyed the whole of it.

1859. You have served against pirates, have you not?—Yes: in everything which has been done against them, with one exception, since 1805.

1860. What is the state of piracy in the Persian Gulf?—They are kept down by being constantly watched; the moment they know that there is not a watch over them, they begin to feel their way and commit petty acts of piracy; there was an instance of it in 1834, in consequence of a vessel being withdrawn to Socotra which was usually employed in the protection of the trade of the Gulf, and others in the Red Sea, and there being only a limited number of vessels, one being employed in the Eastern Straits, the Gulf was left with only two vessels in it; the consequence was, the chief of Abothubby fitted out his vessels and put to sea, and before anything was known or anything could be done, property to the amount of about six or seven lacs of rupees was captured, and the people of course were many of them murdered.

1861. When did this occur? The trial of the pirates took place in 1835; the Elphinstone fell in with them, re-captured several of the prizes, and got back a great deal; but the merchants suffered to the amount of a lac and a half at least.

1862. In what description of boats or vessels is this carried on?—There are three descriptions of Arab vessels; the buggalows, which vary from 40 up to 500 tons; and some being armed with a few matchlocks and swords; others carry two to 16 guns.

1863. How many men do they carry?—Sometimes, in large buggalows, when fitted for war, there are as many as 500 men. Then there is another class of vessels, called battills; they vary from about 20 to 150 tons; those vessels carry in the same manner from a few matchlocks and swords to about six guns; those are particularly speedy vessels in sailing.

1864. Sir *John Hobhouse.*] Do those pirates come down low to the southward, or confine themselves to the upper part of the Persian Gulf?—Of late years, since the expedition of 1819 and 1820, there have been only partial outbreaks; there never has been a general system of piracy since, for there has been a naval force to check them; but, previous to that, they have made captures as far south as Cochin on the Malabar coast.

1865. *Chairman.*] Might not steamers be advantageously substituted for sailing vessels in those seas?—I have already given in upon that subject to the Court of Directors a plan Mr. Loch gave me, the basis on which I was to go; and I clearly showed that with four steam vessels, two of the first class and two of inferior class, with lighter guns, and two sailing vessels, the duties of the Red Sea and the Persian Gulf might be efficiently performed; in addition to which, I have shown the advantage to be derived from the employment of steamers; the instance I have given is, supposing some disturbance at Cutch or near the Indus, that it is necessary to send up during the north-east monsoon, the usual time for field operations, a force to be collected from Poonah or Bombay, 4,000 or 5,000 men, one of the first class steam ships of war, which would not take above three or four or at most five days to reach that port, embarking one regiment in marching order, and two native vessels carrying another regiment with tents and a portion of baggage; were those men sent by land, they would have a six weeks' march; were they sent in sailing vessels, they might get up there in 10 or 14 to 16 or 18 days; in steamers they might be landed in three or four days, and the vessels return and bring up another part of the force, and they would be landed quite fresh and ready for action, and within the distance of probably 60, 80, or 100 miles of the place where they would be called upon to act.

1866. You think, from your acquaintance with the peculiar circumstances of our Indian empire, the employment of steam vessels, not only for the purposes of communication, but of safety and protection and keeping that great empire together, would be peculiarly serviceable?—I have not the slightest doubt of it; at the same time, I consider it necessary to state that there are two points to which their duties will be directed, and in which their value ever will lie: the trade of the

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the Persian Gulf and the Red Sea is immense; they take off large portions of the produce of Bengal; a greater part of the surplus produce of Malabar and Canara; they take off an immense quantity of our imports from Bombay; and the quantity of our British manufactures they take off is very large; I think we cannot reckon far less than a million and a half for the import and export trade of the Gulf; the returns are mostly specie; and I suppose that of the Red Sea also to be to a large amount.

1867. In what way is your opinion borne out, of the superior advantages in the employment of steam vessels over sailing vessels?—In the first place, the steam vessels would always have such superiority over native vessels in which piracy is carried on; whenever they fell in with them, they would be able to cut them off before they reached their port; another thing is with respect to the armament of the steamer; there is not a port on the pirate coast in which the large guns they carry forward or aft would not destroy every vessel in the back water, which the sailing vessels, unless they are vessels of very large size, could not carry ordnance to do.

1868. You consider that the nature of India and the coast are peculiarly suitable to the employment of steam vessels, rather than sailing vessels?—I should say, in regard to the employment of vessels for the Indian navy, it would be most advantageous that they should be steam vessels; still, a small number of sailing vessels is necessary.

1869. (*Chairman.*] Will you state what number of steamers you consider necessary to protect the trade in the Persian Gulf and the Red Sea?—In the plan I have proposed for the Indian navy, in what I have given in to the Court of Directors, I have put two large and two small steamers, and one of the present 18-gun sloops reduced to 14 guns, and one 10-gun brig, exclusive of the several vessels which perform a duty similar to the coast guard in the Guzerat collectorate of customs; there is always a great deal of small pilfering going on in Guzerat and Kuttywen. There are some small craft which perform these duties, but the expense of them is trivial; probably the whole expense does not amount to more than the expense of one of the higher class men-of-war.

1870. You propose to have two steamers of a large description, two of a smaller, and two sailing vessels?—Yes.

1871. How would you dispose of them?—In the first place, it is necessary that one vessel should be cruising in the upper part of the Gulf, in communication with Bushire, where the resident is stationed, that any information he may receive he should be immediately able to communicate with that vessel, to carry into effect any duty; she at the same time would protect the upper part of the Persian Gulf, in a line drawn from Cape Burdistan to El-Katif. Another vessel is necessary to be cruising from Bahraein, taking in the whole line of the Arabian side of the Persian Gulf as far as the Bay of Cassaub. A third vessel, which is supposed to take the whole of the centre of the Gulf, a part of the Pearl Bank, and the whole line of the coast to Bassadore; at Bassadore, you can at all times and in all the prevailing winds, in a sailing vessel, reach any particular point on the pirate coast, and have communication from it; she should cruise off the Island of Kishure, along the coast of Macoon as far as Guadel; she should also occasionally visit Muscat, and run down the Batna coast; that employs four vessels: those are the Persian Gulf duties. There should be three steamers and one sailing vessel in the Red Sea; we must have one vessel to protect our trade there, for though there are not any pirates in the Red Sea, the unsettled state of government is such, if we have not a vessel in that sea the merchants are plundered and trade injured. In 1833, the whole of the Surat vessels were stopped at Mocha, and money was extorted from them, when the timely arrival of the Honourable Company's brig of war Nautilus, which had been despatched from Surat, prevented their being further plundered; but the season, in consequence of their detention, was passed in which they could trade, and they lost that year all their emoluments or profits from the trade of the place.

1872. With this monthly steam communication with the Red Sea, that vessel would become unnecessary, would it not?—I doubt that, speaking from the inconvenience felt by the surveying vessels; if you once attempt to interfere with the particular duties the steam packets are employed on, connected with that service, the regularity of the communication is broken, and great public inconvenience must result.

1873. Sir

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1873. Sir *John Hobhouse.*] You would not recommend the mixture of war duties with packet duties for the steam vessels?—Certainly not; if there is not intended to be a breach in the regularity of the communication: suppose, at Mocha, a merchant vessel had arrived, and the government had seized upon it; the steam packet arrives, the commander cannot devote the time that may be necessary to afford that protection and to see those persons righted. But there would be this advantage to the packet navigation, by employing a steam vessel instead of a sailing vessel of war in the Red Sea, should the steamer break down, the war steamer may take her duties within the sea for a time; then a sixth vessel would be required for the purpose of reliefs to the Red Sea or the Persian Gulf; one vessel is as little as can be. I have been for 18 months without relief in consequence of the want of a vessel, and six months on a cruise at one time is as much as any vessel or crew ought to be called upon for in such a climate as the Persian Gulf or Red Sea.

1874. Mr. *Mullins.*] You are acquainted with the wear and tear of steam machinery in this climate; can you form any opinion as to whether there will be a greater degree of wear and tear in the Indian seas in consequence of the greater heat of the climate there than here?—I should think not.

1875. Sir *John Hobhouse.*] Your general opinion is, that taking the line from the Red Sea to Bombay, or taking the line round by Galle to the eastern shore, that is to Madras and Calcutta, there is nothing in the present state of science to prevent a regular steam communication being kept up with the three presidencies?—I have no hesitation in saying there is no difficulty whatever; and, as I have before said, I speak from long experience, having been 27 years employed in those seas; and there are, I believe, few people who can give a more competent opinion. When I left India, I should have said, there was a difficulty; but what I have seen since I came to England has convinced me that the communication may be kept up monthly.

1876. Whether to Bombay, or whether to the other two presidencies also, you think there is no difficulty which will prevent the keeping up a monthly communication between this country and those presidencies?—No: when the subject was broached to me at the India House, after I had been amongst the steamers, I at once stated that I was perfectly ready, on my return to India, to make the first start with a south-west monsoon, and to stake my reputation upon it.

1877. *Chairman.*] How many sailing vessels have you had occasion for in the Persian Gulf at the same time?—Generally four.

1878. Mr. *Mullins.*] Do you think Camaran would be the best depôt in the Red Sea?—No; I will give a reason: there is a periodical wind, in which sailing vessels cannot get out for a certain number of months: it will not do to have a depôt, and to have a vessel detained there, and the expense of months' demurrage. Perim is a port of the Red Sea, which has every advantage of a harbour, and everything necessary: the sailing vessels may go there, and deliver their coals, and the moment their coals are out they may start off. If they are in the Red Sea they are tied up for three months in the year, because the wind blows so furiously into the Red Sea, you cannot get out; the vessels of war may beat out, but they will have a great superiority over merchant vessels.

1879. Do you mean to say a steam vessel of sufficient power cannot beat out? —I speak of sailing vessels carrying coals into the Red Sea; they would be detained, and an immense expense incurred; whereas, by the use of Perim, which is a port equidistant, and has every facility, the vessels can land their coals, and get off.

1880. Are you not aware that Camaran is more equidistant between Socotra and Suez than Perim; and do you not think that in consequence of that it would be better adapted for such a depôt than Perim?—I am perfectly aware of that, so far; but I think, with proper steam vessels, except in the south-west monsoon, they will require no more than one depôt between Bombay and Suez.

1881. Are you not aware that there is no water to be had at Perim?—I am.

1882. Would not that be a great obstacle to the establishment there?—No; for just opposite, at Cape Babelmandeb, water is plentiful, and might be brought over in any quantity.

1883. What is the distance across?—About five miles; but I do not see any advantage in increasing the number of depôts.

1884. What is the amount to be allowed in annual charge upon the prime cost

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cost of a steam vessel, on the capital sunk, for interest, insurance, repairs and renewals, at a rate calculated to create and perpetuate the property?—I am not prepared to answer that question.

1885. Have you formed any estimate of the comparative expense of delivering fuel at different depôts, in the event of a regular communication being established with the three presidencies?—I have taken what I should term the average expense of fuel, supposing it to be purchased at the various depôts. I have also formed an average estimate of what I consider the expense of the management of those depôts; one part of that is by means of a floating depôt; that is the best in the south-west monsoons; even if Socotra were used, it would be the best. The steamers may go alongside a floating depôt, and much time would be saved. I have framed an estimate of the expense of the depôts and the fuel. I will give it in.

[*The same was delivered in, and is as follows:*]

ESTIMATED EXPENSE of running Three Steam Vessels as Packets between *Bombay* and *Suez*, each Vessel to be from 700 to 750 Tons.

I WILL begin with coal, and though I am aware it has been stated by most who have wrote on steam navigation in these parts, that when there is a demand for coals, ships going out will take them as ballast, and consequently they will become cheap, if reliance on such a source is had recourse to, the monthly communication will fail for want of supply, and also, the holders of coal knowing you must take them, will put their own prices upon them, which certainly will not be low; coals must therefore be sent from England direct to the depots, and I think for Bombay and Red Sea together, 50 s. per ton will be a fair average.

I consider the time of the voyage to Suez from Bombay, and Bombay to Suez, to take up, if all done under steam, 18 days, or 36 days' steaming per month for two vessels, and at 18 tons per diem consumption, will be 7,776 tons per annum, add 100 tons for wastage, dust, &c., give 7,876 tons; allowing 50 s. per ton, this will cost per annum - - - - - - - - - - - - -	£. 19,680
Stores per annum for three vessels - - - - - - - - -	3,500
Pay and provisions for captains, officers and crews of three vessels - -	12,084
* Expense of two floating and one shore depot, in and near the Red Sea -	3,500
* Depot at Bombay - - - - - - - - - -	1,000
Supposed outlay on three steam vessels to be 120,000 *l.*, as the Company do not insure, allow on this seven per cent. - - - - - -	8,400
* Coal hulks, say 20,000 *l.*, seven per cent., is - - - -	1,400
* For a foundry to make repairs, materials, &c., at 20,000 *l.* - -	1,400
* Establishment and expenses for working the above, including engineers, boiler-maker and all other workmen, per annum, abt -	3,400
Spare parts of engines, say to the value of 20,000 *l.*, at seven per cent. -	1,400
Contingencies, at 12 per cent. - - - - - - - - -	5,372
	£. 50,136

In this estimate I have, I believe, included every possible expense; many will be reduced when we are able to get natives instructed as working engineers, though it will be long before a chief engineer from Europe to each vessel can be dispensed with.

As sail may be much used, a saving, with care, of perhaps one-third of the estimated expense of fuel may be made.

Those items with * prefixed, will not be increased by any number of steam vessels being employed, they being equally necessary for one as for ten.

There may be some omissions in these calculations; still I do not think there can be any of the least consequence to the whole.

Geo. Barnes Brucks,
Captain, Indian Navy.

The Right Hon. Sir *Alexander Johnstone*, called in; and Examined.

Right Hon.
Sir *A. Johnstone.*

1886. *Chairman.*] HOW long were you in His Majesty's service in Ceylon?—Sixteen years. During that period I filled successively the offices of advocate-general, judge, chief justice of the Supreme Court, and president of His Majesty's council.

1887. Were you in 1809, when a member of His Majesty's council on that island, sent officially to England by the government of the island, for the purpose of urging the adoption by His Majesty Ministers of certain public measures which you conceived to be of advantage to the island?—I was sent officially to England by the government of Ceylon in that year, for the purpose of proposing

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posing to His Majesty's Ministers various measures which I thought necessary to restore the ancient trade of the island, and to improve the condition of the natives. Amongst many others, I proposed three measures, which were more immediately connected with the improvement of the trade of the island. The first was, to make Point de Galle, by declaring it a free port, and by holding out many advantages to vessels of all nations which might stop there, an *entrepôt* of the trade which is carried on between Europe, Africa and America, on the one side, and the coasts of Coromandel, Bengal, Sumatra, Java, Malacca, Siam, Cochin China, China, and all the Eastern Islands on the other. The second was, to deepen the narrow channel in the Gulf of Manar, called the Paumbun Passage, so as to enable vessels drawing from 10 to 12 feet water to pass through it. The third was to deepen the entrance into the harbour of Cocheen, on the Malabar coast, and to open a communication by water from that coast to the coast of Coromandel, through the break in the Ghauts, called the Pauleaud Cherry Pass, by uniting the waters of the river Paniyani, which fall into the sea on the former coast, to those of the river Caveri, which fall into the sea on the latter coast.

1888. Do you think that making Point de Galle one of the stations for the steam-boats employed in the steam communication between Egypt and British India will forward the objects which you had in view, by the measures to which you have alluded, and be of great use to the island?—I conceive that it will be of the greatest use to Ceylon, by introducing capital through that port into the southern part of the island, and by bringing capitalists to it who can purchase the many valuable articles of trade which are produced in that part of the island.

1889. Do you think, from what you have seen and heard of the place, that Point de Galle will be a good and safe harbour for the steam vessels? —I think so from an inspection of this chart, and from what I have heard from persons competent to give an opinion upon the subject. Mr. Gibson, a very old and intelligent seaman, who was master attendant at Point de Galle in 1808, when I was preparing to come to England for the purposes I have mentioned, gave me this chart of the port, which he had himself made from his own personal observations, and also a very detailed memoir, written by himself, of every circumstance which may be necessary to enable seamen and merchants to form an opinion upon the nature of the port. Point de Galle, from my own personal observation, seemed to me to be a very convenient port for merchant vessels to stop at, because a great quantity of cocoa-nut oil, arrack, coir, coffee, cinnamon, and other articles of trade, can be conveyed to it without difficulty from different parts of the country, because there were warehouses there in which the merchants could deposit their goods, and because there was a plentiful supply of fresh provisions, vegetables, fruit and good water, and a fort to protect the shipping in the harbour.

1890. Do you think that it would be a convenient place to come to for passengers, as well those who are going from England to India as those who were coming from India to England?—I think it will, because passengers may go from thence to all parts of India, either by embarking in a vessel at that port or by going overland to Colombo or Manar, and crossing over the sea from either of those ports to the peninsula of India, because the place is extremely healthy, is situated in a very pretty country, and affords great facilities for visiting the finest and most interesting parts of the island, has a daily post, by which one can communicate with every part of India, and because there is a very fine road, along which you may drive a carriage and horses all the way from it to Colombo.

1891. Do you think that the establishment of a steam communication between England and British India through Egypt will be of use to the northern part of the Island of Ceylon?—I think it will, because I think it will ultimately lead to the deepening the Paumbun channel to which I have alluded, and to the carrying on again through that passage, in the same manner as it used to be carried on till the middle of the 14th century, a considerable portion of the trade which is carried on between the eastern and western sides of the peninsula of India. The trade between Egypt on the one side, and China and the Eastern Islands on the other, was, in ancient times, carried on, I think, from the port of Adulis, on the western side of the Arabian Gulf either by sea, through

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the Paumbun channel, or by land, through the northern part of Ceylon, with Trincomalee, and from thence with China and the Eastern Islands.

1892. Why do you particularly refer to the 14th century?—I do so because from the inquiries which I made many years ago, along with the late Colonel Colin Mackenzie, into the ancient history of the peninsula of India, I found that vessels of very considerable burthen used to pass through that channel until about the middle of the 14th century; that about that period one of the chiefs of the Marawar country, which is situated along the south-east coast of the southern peninsula of India, for the purpose of protecting his coasts from the attacks of the large Arab vessels which used to come from the Malabar coast, through the Paumbun channel, and plunder the towns he had upon the sea-shore, sunk a great many boats full of large stones and pieces of rock in that channel, and rendered it impossible afterwards for any large vessels to pass through it. On referring, in the year 1806, to some papers of my father-in-law, the late Lord William Campbell, who at the time he wrote them was serving as a lieutenant in the Indian squadron, I discovered that he had, about 30 years before that period, examined the Paumbun channel, and made several very curious observations upon it, and had come to the conclusion that in former days it must have been much deeper than it was then, and that it was practicable to deepen it again, so as to admit of vessels drawing from 10 to 12 feet water passing through it, as he states in a letter to his brother, the late Duke of Argyll, and Marshal Conway, who was at that time a member of the then administration. In 1807 I went all along the passage in a boat myself, for the purpose of examining it; and though I had no scientific man with me, I was led to the same conclusion as Lord William Campbell had been, from the observations which I myself made upon the spot, and from the information which I received from the Brahmins of Ramisseram, an island near the Paumbun passage.

1893. Do you think, from the information which you have collected upon the subject, that it would be practicable to render Cocheen, if the steam communication is once established between Great Britain and India, a useful port of trade; and that it will be of advantage to the southern part of the peninsula of India to make a water communication from the Malabar coast to the Coromandel coast?—From some papers upon the subject, which I procured from the Dutch archives of Cocheen, I think that Cocheen may become, if the steam communication between Egypt and India be permanently adopted, a port of considerable commercial importance to the trade of the southern peninsula of India, particularly if it should be found, upon further examination, to be practicable to make a water communication between the coast of Malabar and the coast of Coromandel, through the Pollichandcherry Pass. The trade between Egypt and the southern part of the peninsula of India was in ancient times carried on, I think, from the port of Adulis, with Cochin, and from thence by land through the Pollichandcherry Pass, with the ancient kingdom of Pandy, and all the other countries in the southern part of the peninsula of India.

1894. Do you recollect any estimate being made at the time for deepening the Paumbun pass?—A rough estimate was made at the time for me. It appeared that the expense of deepening the Paumbun channel, in the manner I have described, would amount to about 20,000*l.*; and that, by levying a small duty upon the vessels which were likely to pass through it, that sum might be repaid to Government in a few years.

1895. Do you conceive that great and advantageous moral and political changes will be produced in the condition of the natives of India by the establishment of a regular and frequent steam communication between England and every part of British India through Egypt?—I conceive it to be the most efficient measure which can be adopted for raising the moral and political character of the natives of British India, and for affording them those moral and political advantages which they have a right to expect to derive from their present connexion with Great Britain. It will, from the shortness of the passage, and from the interest which is attached by all persons to the countries through which the travellers must pass, induce many persons, as well Englishmen as foreigners, who otherwise never would have thought of doing so, to proceed to India, and make themselves acquainted with the history and people of that portion of Asia; and thereby call the attention of Europe in general, and of the

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British public in particular, to every circumstance of importance which is connected with the subject. It must ultimately improve the nature of the British government of India, by enabling the natives of the country, without doing an injury to their religious habits and feelings, to come to England, and submit their opinions upon all public questions involving their public and private interests, directly to both Houses of Parliament; and thereby render it necessary for the local governments of India to consult the natives of the country on all questions in which their interests are concerned. It will secure for the natives an efficient system for the administration of justice throughout their country, by affording them, in case they think themselves aggrieved by any decision which has been given by any British court established in India, an easy way of getting their appeals to England with less delay and less expense than is the case at present. It will be the means of improving the minds and raising the character of the natives, by enabling them to observe upon the spot the practical effect of our religious, moral and political institutions, of our constitution, of the influence of the press, and of public opinion upon the Government, and of the share which each Englishman has, either directly or indirectly, in that Government. It will make them acquainted with the application of machinery and chemistry to agriculture and manufactures: it will give them a taste for the arts, science and literature of England, and a desire to introduce them amongst their countrymen. The effect which is likely to be produced upon the minds of those natives of India who may hereafter be induced to come to England may be fairly estimated from the effect which a residence in England has had upon the mind of Prince Jamh-ud-Din, a Mahometan, and a grandson of Hyder Ali, and upon that of the late Rammohun Roy, a Hindoo, and a Brahmin of high caste; the former having travelled through England, Scotland and Ireland, and having acquired a general knowledge of the country and its institutions, has, I understand, become a proprietor of India stock, and thereby qualified himself to take an active part in the British government of India. The latter, after having studied for some time with great attention the nature of our laws and institutions, gave some very important evidence relative to British India and his countrymen before a Committee of the House of Commons, and wrote an able pamphlet in favour of the regulation abolishing suttees at the time that regulation was discussed on an appeal against it before the King in Council. He told me that 18 Brahmins and four Rajpoots, of his acquaintance, in different parts of India, had, in consequence of his having written to them an account of the manner in which he had been received in England, and of the knowledge which he had acquired since he had been in the country, authorized him, in the event of a steam communication being established between England and British India through Egypt, to purchase land for them in England, intimating to him their intention of coming and residing for some years in the neighbourhood of London, and making themselves acquainted, for the benefit of themselves and their countrymen, with our laws, science and institutions; and not long before his death, he one day when he was with me drew up in my presence the sketch of a work which he intended to write in imitation of Cicero's Tusculan Questions, and to circulate it throughout every part of India, purporting to be a Dialogue between a Brahmin from the Thames and a Brahmin from the Ganges, in which, after discussing our moral and political institutions, both Brahmins agree to recommend such of their countrymen as can afford it to come to England and acquire that degree of knowledge which is necessary to raise them to that moral and intellectual superiority which the Supreme Being has qualified them to enjoy in this world. He was very unwell at the time, and requested me, in case of his death before he could complete the work, to destroy the sketch, which I have done.

1896. Do you anticipate any danger to the British dominion from such improved knowledge?—I do not; I conceive that you cannot prevent the diffusion of knowledge throughout India, and that the surest way of retaining the dominion of the British Government over India is to establish a good system of education amongst the natives, and to give them such a share in the government of their country as may make them feel that they have a deep interest in the duration and security of that government.

1897. Mr. *Mullins.*] In the event of communication with India being limited, according to the plan at present determined on between the Government and the East India Company, do you suppose that the expenses that would

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be created by that limited intercourse would be much greater in proportion than if the intercourse was to be established upon a general and comprehensive plan? —Not having directed my attention to the subject, I do not feel myself competent to give an opinion upon it.

1898. Would the other presidencies have, in your opinion, just cause of complaint, and would they not feel very much annoyed if the communication was to be restricted to Bombay, and advantages thereby given to that presidency which other presidencies would not have it in their power to enjoy?—I certainly think they would have a most just cause of complaint.

1899. Do you not consider it a matter of much more importance that a direct communication should be established with Calcutta, being the chief of the presidencies, than with Bombay?—I myself think that a direct communication ought to be established with all the presidencies.

1900. If there was to be only one communication, is it not your opinion that the one with Calcutta would be far preferable to the one with Bombay, and that Calcutta would have greater claims?—If there was to be a direct communication with only one of the presidencies, I think it ought to be with that one which is of the greatest commercial and political importance.

1901. Do you suppose that in the event of there being a limited communication to Bombay only, passengers would be likely to avail themselves of that mode of communication to pass to Madras or Calcutta by land, in place of going by sea by the Cape of Good Hope?—I should think that single men would always prefer going to Bombay by the steam communication, and from thence by land to Madras and Calcutta; but that married men, with families, at least for the present, while the steam communication is in its commencement, would prefer going round the Cape of Good Hope by sea.

1902. You do not think it would be convenient for women or children?—I should think, from what I hear, that it is not at present convenient for women and for children.

1903. Is it your opinion that a greater number of passengers than at present go by the Cape of Good Hope would be likely to avail themselves of the quicker mode of communication with India now proposed?—I think a great number of travellers from England and from Europe are very likely to go to India now that a steam communication is established who would not have thought of going if they had been obliged to go to it by sea round the Cape of Good Hope.

1904. Do you suppose it likely that literary works would be despatched from this country in a much larger proportion than they are at present, in consequence of the greater facility of intercourse?—I think that a greater number of periodicals and literary works of that description are likely to be sent to India now that the passage is so short than there were when the only conveyance for them was round the Cape of Good Hope.

1905. Do not you think that, in relation to periodicals and that species of literary works, the speedy transmission of them would increase the sale?—I have no doubt it will.

1906. According to your consideration of the various advantages, commercial and other, likely to arise from a more speedy communication with India, is it your opinion that there ought to be a communication immediately established with the different presidencies, and not limited, as at present proposed, to one? —I am decidedly of that opinion.

1907. Can you form any idea of the superiority of the advantages, in point of return, that would be derived to India from a more general communication? —I have not directed my attention to the subject, and cannot venture to give an opinion upon it.

Jovis, 13° *die Julii*, 1837.

MEMBERS PRESENT.

Lord William Bentinck. Mr. Gordon. Sir John Hobhouse.	Mr. Mullins. Lord Sandon.

RIGHT HON. LORD WILLIAM BENTINCK, IN THE CHAIR.

Captain *Melville Grindlay*, called in; and Examined.

Capt. *M. Grindlay.*

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1908. *Chairman.*] YOU were in the Company's military service?—I was.

1909. How long were you on the Bombay establishment?—Fourteen years: I have been returned 20 years and more.

1910. Have you kept up any connexion with the officers of the civil and military Company's establishment in India since you returned?—A most extensive one. I have maintained correspondence with every part of British India, and I have constantly been associated in this country, both in matters of business and in social intercourse, with a wide circle of persons connected in almost every possible way with India: with some who have passed long periods there, and have finally quitted it; with others, whose absence is only temporary, and who propose to return; with others again, who are about to proceed thither for the first time, and with many who, though never resident in India, and never intending to reside there, are in various ways connected with it, and are intimately acquainted with the wants, wishes and feelings of the inhabitants both British and native. I may mention also that the circle to which I have alluded comprehends persons in different professional walks; members of the civil service, of the military service, and of the commercial community. I may, I believe, without incurring the imputation of undue assumption, say that my acquaintance with those interested in India and its people is little short of universal.

1911. Will you state what the feeling of those individuals generally is with respect to steam communication in India?—I know the feeling in favour of a regular system of steam communication to prevail almost without an exception, and that it is expressed with a degree of intensity very rarely excited by any public question in a country so little favourable to the development of moral or physical energy. The extension of this feeling has for some years past been progressive, as is well known to the Noble Chairman of this Committee, and the greatest disappointment would be felt if the desired boon were refused, or even unnecessarily delayed, or limited to Bombay only.

1912. How far would the Indian officers, civil and military, in your opinion, be disposed to avail themselves of the route by the Red Sea?—I have no reason to doubt that, in the first instance, perhaps the first year or two, there would be about one-fourth of the whole number of passages, which would gradually increase, as the accommodation became more constant, defined and certain, to four-fifths of the whole number, that is, provided only that it be extended beyond Bombay, to Madras and Calcutta.

1913. Do you give that opinion founded on any specific data or circumstances?—The circumstances on which I have founded that opinion are the frequent conversations I have had with gentlemen connected with India, contemplating their return, and the many applications I have had from them for information connected with it, and for the purpose of making arrangements to enable them to avail themselves of it, when it should become fixed and certain.

1914. What is your opinion of the relative expense between the passage round the Cape of Good Hope and the passage by the Red Sea?—I should think that

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it would be about equal; probably the expense overland may be hereafter diminished, but that will very much depend upon the arrangements which are made, of which I can have no knowledge at present; I cannot entertain any doubt of it; they would gain much in point of time, and they would gain much in point of certainty; and in place of the unpleasantness and danger attending a passage by the Cape, they would enjoy a trip of pleasure on the Mediterranean. I say nothing of the opportunity of visiting places rendered interesting by historical recollections, although this would also operate with many, if not with the majority; but looking only to the superiority in point of speed, certainty and comfort, it appears to me incredible that such advantages should be rejected, if placed within reach.

1915. Would there be any difference with respect to the outfit?—In the equipment of officers in returning, I conceive there would be; because an officer returning by the Mediterranean and the Red Sea would require a much smaller sea stock, and that is a considerable portion of the expense of an equipment; he would probably send round to the presidency by sea the bulk of his baggage, and would require a very small portion with him; I think he would save by it. Steam navigation is undoubtedly more expensive than the ordinary mode, but then the time consumed in it is much less, and consequently the requisite outlay for the subsistence of the passengers will be much diminished. This applies especially to the class of passengers who usually pass between England and India. Where passengers are of a very humble class, and require only ordinary accommodation, the difference between keeping them one month or two, would not be great; but where they expect a high degree of comfort, and even some degree of luxury, the saving effected by the abridgment of time will be considerable. The comparative certainty of the passage also will enable a commander to proportion his supply of stores to the demand more accurately than when he has no means of judging, with any fair degree of probability, how long his voyage may last, and this will be another source of saving. With all these advantages, the passage by steam must still be expected at first to be somewhat higher than the present amount of charge; but wherever time is an object, and wherever comfort is an object, it will be cheerfully paid.

1916. Mr. *Mullins*.] Have you considered the comparative expense to the Company and the Government of a general communication with the different presidencies, and the particular communication as at present arranged to Bombay?—I am not prepared to speak with any degree of useful certainty on that part of the question; it does not lie within the reach of my ordinary routine of business; I can therefore only give an opinion formed on documents which have been before the Committee.

1917. Are you aware that, in a communication with Bombay alone, there must be a certain number of depôts and establishments for coals; for instance, hulks; and that, in the case of a general communication, there would be no necessity for any extra establishments to a certain extent?—I am aware of that; and it has appeared to me, in reading the documents and the evidence given, a very strong argument in favour of a comprehensive plan, that a very small proportional difference of expenditure will accomplish a much more advantageous result: I consider it worth any partial increase of expenditure. If the communication be confined to Bombay, its advantages will be in a great degree confined to Bombay also. The rest of India will gain something in the transmission of letters, but that will be all.

1918. And the increased expenditure, you think, would be met by a countervailing return?—I have no doubt of it. By confining the communication to Bombay, those who undertake it will lose nearly all the profit to be derived from the conveyance of passengers; and further, they will lose, even in a greater proportion, the profit, probably much larger, to be derived from the conveyance of goods of small bulk. Nothing but letters will be forwarded overland from Bombay, where a sea conveyance of any kind can be had. Now in a vessel of a proper description, there will be a considerable tonnage, (considerable, I mean, in relation to the object,) applicable to the stowage of goods of small bulk. This advantage must in some degree be lost during a part of the year on the Bombay line, from the necessity of carrying an extra quantity of coals while the moonsoon is at its height; but to and from Calcutta it is always available, and would be at once a source of great accommodation to the public and of

profit

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profit to the government. This advantage, as well as many others, will be lost, unless the more comprehensive plan be adopted.

1919. In India, you believe the feeling in favour of the comprehensive plan to be very strong?—It is as strong as any feeling of the kind can be, and is entertained almost universally. No other plan will afford either adequate accommodation or any general degree of satisfaction.

1920. *Chairman.*] Do you know that it is in contemplation at any of the presidencies in India to establish a steamer on private account?—I am led to conclude there is some intention of the kind, as a Bombay presidency gentleman, who arrived within the last two months, who came by the last overland route, applied to me for information regarding the purchase of steamers ready built, or the construction of them after a certain plan and dimensions, and he stated that it was contemplated by the commercial gentlemen of Bombay to run a steamer from it to Ceylon, touching at various ports on the Malabar coast; he has since informed me that nothing specific has been determined on.

1921. Have you heard that a steamer called the North Star is about to be sent out to Calcutta on private account?—I have heard of that.

1922. Do you anything of the establishment of a steamer at the Mauritius?—I do not.

1923. Or in Australia?—I have heard that there are some running backwards and forwards, and that they are considered of great value to the community.

1924. In your communication with officers belonging to the China trade, do you believe that the correspondents and passengers would take that line from Galle to Canton?—I have not had many opportunities of conversing with persons connected with China; but, from the general observations I have made, I am inclined to think passengers for all parts of the East would most gladly avail themselves of this route, if made comprehensive.

1925. Mr. *Mullins.*] Have you formed any opinion as to the size and power of the vessels it would be best to put on such stations?—I could not give an opinion that would be useful, not being sufficiently informed upon that subject.

1926. *Chairman.*] With regard to passengers, how far would those proceeding to and from Madras and Calcutta be benefited by a steam communication confined to Bombay?—Scarcely at all; speaking generally, none would submit to the fatigue and inconvenience of the land journey between either Madras and Bombay, or Calcutta and Bombay, if it could be avoided. Of those proceeding to India, the greater portion are not inured to the climate, nor accustomed to the modes of travelling. It is true that they must in many cases be compelled to undertake a land journey in order to arrive at their respective stations; but the necessity of making one disagreeable and dangerous journey can afford no reason for adding to it another, that may be avoided; on the contrary, as far as it affects the question at all, it operates the other way, it is an additional reason for avoiding land travelling, where it may be avoided. With regard to those quitting India, the case is still stronger; it is not too much to say that the majority of those returning from India is composed of females, children, and persons in ill health, who require all the ease and comfort that is attainable; to them a tedious and inconvenient land journey, and more especially if it is to follow one of a similar character, is out of the question; and the consequence will be, that those who stand most in need of the advantages of a steam passage, and who on the ground of humanity have the greatest claim to accommodation, will, under two of the presidencies, be deprived of that which is so desirable for them; they must submit to all the delay and inconvenience of a voyage by the Cape; and whatever their state of health, or the urgent necessity of their early arrival in England, they must pass four or five months on a passage which might be accomplished in less than two.

Major *C. F. Head*, called in; and further Examined.

Major *C. F. Head.*

1927. *Chairman.*] CAN you give any information respecting the Maldive Islands? I hold in my hand a report, which was sent from Calcutta, of a survey made by Captain Moresby, of the Indian navy, in which it is shown that Heawandee Island, the head of the Maldives, is a place capable of receiving a steamer at all times of the year, and of affording safe anchorage; that it may be available at any time, and that it divides the distance between Socotra and

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Point de Galle, so that the long stage would be only 1,173 miles, which is the distance from Zamareed to Heawandee Island; and the distance from Heawandee Island to Point de Galle is 426 miles; so that there is no stage between England and Calcutta having a distance of more than 1,200 miles. There is also a list, in the survey, of the population, and the number of boats in those islands, which shows that every facility can be afforded for steam vessels.

[*The Witness delivered in a Description of Heawandee Pholo, the Northern Atoll of the Maldive Islands, with a Map.—Vide Appendix.*]

The Honourable *Mountstuart Elphinstone*, called in; and Examined.

Hon. *M. Elphinstone.*

1928. *Chairman.*] WHAT is your opinion of the probable effects, political and moral, of a communication with India by steam?—I think the effect would be highly advantageous, both in a political and a moral view.

1929. Have the goodness to state the political advantages you would expect from it?—The most obvious is that of a ready transmission of intelligence and instructions during war, especially with an European power; but many inconveniences would also be removed by more speedy communication in matters relating to the internal government. Much time is lost in waiting for replies to references on ordinary subjects; and as there are various important points in which the government is restrained from acting without authority from the Court of Directors, opportunities must often be lost, and evils left uncorrected, during the time occupied in obtaining the requisite sanction. I am aware that a great part of this delay is occasioned by other causes than the slowness of the communication; but I think that if a speedy and certain channel were established, there would be greater dispatch in inquiry and decision than are likely to be while it is doubtful whether such exertions will be of any avail. Some bad consequences may follow an accelerated intercourse between the governments here and in India, but none which may not be avoided by care on the part of that in England. The authorities at home would probably forbear from availing themselves of the greater means of interfering with affairs, during their progress, which in almost all cases are better left to those on the spot. They might also be as much depended on as ever for taking time to consider of all proposals for great change, and for avoiding all such proceedings as were likely to diminish the importance and responsibility of the local governments.

1930. What do you conceive will be the effect of increased facility of communication on the members of the Company's service?—It may perhaps lead to inconvenience, by promoting appeals and the employment of private interest against the decisions of the local governments; but that will be more than compensated by the more frequent visits of the Company's servants to England, and the greater infusion of European ideas, which cannot fail to extend their views and increase their efficiency. It will also tend much to strengthen their connexion with their native country, the possible diminution of which has on former occasions given rise to serious apprehensions.

1931. What would be the effect of a ready intercourse on the other classes?—I do not think that the other classes would be so much affected by the improvement of steam communication as the Company's servants. It would not increase the number of settlers; for when a man has made up his mind to a permanent residence in India, a month or two more or less in the length of the voyage would make little difference to him. The same applies to missionaries, editors of newspapers, and others who are likely to give too great an impulse to discussion in India. It would probably increase the number of travellers, who will have the attractions of Egypt and Arabia, instead of the discouragement of a monotonous sea voyage. This will be useful, from its effects, in India, and still more so from the attention it will draw to that country, and the interest it will excite about it at home.

1932. What do you think will be the effect of a more easy communication with England on the natives?—I think it will have the best effects, though they may not be felt to their full extent at first. The real obstacles will not be much diminished; for after the effort necessary for a native to form the intention of visiting a country so remote and so unlike his own, the addition of a short time to his passage would not be likely to deter him; but there is a great deal in getting rid of the vague dread of a sea voyage; and although the overland

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journey, as it is called, would prove to be almost entirely made by sea, yet, when once a native had been tempted to inquire into particulars, he would find the actual difficulties to be very small. The novelty of a steam conveyance will excite attention. Two or three successful visits will lead to more attempts; and it is to be hoped that the fashion will spread among the rich and educated classes. The advantage of the visits of such persons would be incalculable. More would be learned by an intelligent native during a year's residence here, than by many years' study in India; and each individual, on his return, might open more ideas to his countrymen than the ablest European could ever hope to do.

1933. Do you apprehend any ill consequence from the influx of natives into England?—No. There may be an increase of petitioners at the India House, which is troublesome, without being of much use, for their affairs are seldom such as the Court of Directors could interfere in; but if it is not required for redress of grievances, it is useful as a vent for discontent; and no man will undertake such a journey, with the knowledge that a year's residence will also, in all probability, be necessary in this country, unless he is actuated by strong feelings of the importance of his case. A greater evil would be, its teaching native princes and rich individuals to look to England, and to hope to effect, by intrigue and by private influence here, what they have failed to accomplish in India; but there is more to be feared from Europeans than from natives in such intrigues, and there is less chance of their being resorted to now than there was when this country was less known in India. It is also sometimes said, that a familiarity with the institutions of Great Britain would indispose the natives to obedience to the government in India; but I do not see that danger. If they only get a taste for popular government, or a disposition to legal assertion of their rights, it would be an improvement in their character; and with respect to factious feelings against the local government, I think they are more likely to acquire them in Calcutta than here, where they are less liable to be dazzled with the novelty of liberal opinions, and where they may observe that it is not so simple a matter to carry those opinions to their full extent as it seems at a distance. Besides, I do not think that there is any fear of disturbances in India from democratic principles. The real sources of danger there, are national prejudices and religious enthusiasm, both of which would be weakened by visits to England.

1934. What other effects do you think steam navigation would have in India?—I think the free communication, as far as it went, would be useful in many ways; merchants would have more facility in ascertaining the state of the markets, and manufacturers in suiting their productions to the native taste. The greater quickness with which books and instruments might be ordered, the greater ease in printing both native and European books, and, above all, the increased attention which we might hope the two countries would pay to each other's proceedings, would be the means of procuring important benefits to India. The effect of the more direct influence of the English press might have been questionable while that of India was restrained; but I think there is no doubt that it would be useful now. If the acts of the Indian government attracted notice in this country, the discussion of them by the newspapers attached to different parties would secure a more impartial examination of them than they might meet with in India; and if in the progress of colonization there should come to be any opposition of interest or feeling between the Europeans and natives, I think the natives would have a better chance of being treated with fairness in an English newspaper than in an Indian one.

The Right Honourable Lord *William Bentinck*, Chairman of the Committee, Examined.

Right Hon. Lord *Wm. Bentinck,* M.P.

1935. Sir *John Hobhouse.*] HAVE you prepared any statement with reference to an extended plan of steam navigation with India?—I have.

1936. Will your Lordship have the kindness to produce it?—I will state my opinion that subject. The total distance from Calcutta to Suez is 4,810 miles: supposing one voyage from Calcutta to Suez and back to be made monthly, the total distance is 115,440 miles; the distance from Bombay to Socotra is 1,210 miles; which for 24 voyages gives 29,040 miles. The whole distance will be 144,480 miles to be made by steamers.

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1937. Do you mean that that is the direct distance, or the distance it would be necessary for a steam-boat to take in order to make the voyage?—It is the direct distance. According to the calculation of Mr. Peacock, one steamer can perform only 16,000 miles per annum; but according to a calculation of the Peninsular Steam Navigation Company, one steamer can perform 24,000 miles. I have taken a variety of numbers of miles, between 16,000 and 24,000, as showing the number of steamers that would be necessary. Supposing a steamer to go 16,000 miles, there would be required nine steamers for the whole communication; supposing 18,000, eight; 20,000, seven; 24,000, six. I will assume ten steamers as a proper establishment for the comprehensive plan.

1938. When you say ten steamers, do you mean ten in employment, without any laid up to be occasionally employed?—I mean for the whole. The expense of two steamers, taken from the cost of the Hugh Lindsay, is estimated by Mr. Peacock at 22,000*l.* per annum; an estimate has been put in by Captain Brucks, a very old officer of the Bombay marine, with very minute calculations, giving the expense of each steamer under 17,000*l.* per annum. I know that the expenses of the Hugh Lindsay were very extravagant, as to the table, coals, and generally as to repairs and outfit; I will therefore take the estimate at 20,000*l.* per annum, which is 2,000*l.* less than Mr. Peacock, and 3,000*l.* more than Captain Brucks': the expense of ten steamers, at 20,000*l.* a year each, makes 200,000*l.* Then the profits I have estimated as follows: I conceive that the passengers in the first year would be 800; the second year, 1,200; and the third year, 1,600; total, 3,600; giving an average of 1,200 per annum. The whole number that go round the Cape of Good Hope, I think, are about 3,200 per annum. The passage-money I calculate as follows: Calcutta to Suez, 70*l.*; Madras, 65*l.*; Bombay, 60*l.*; giving a profit of 50*l.* on each passenger: 1,200 passengers, at 50*l.*, gives 60,000*l.*; 200,000 letters, at 1*s.*, between Suez and Calcutta, 10,000*l.*; freight, 50 tons, at 5*l.* (each vessel being calculated to give 100 tons), 6,000*l.*; parcels and periodicals, 100*l.*, for 24 voyages 2,400*l.*; despatches, 500*l.* for each voyage, 12,000*l.*; giving a total of 90,400*l.* The total charge, then, is 200,000*l.*; the profits, 90,000*l.*; leaving a deficit of 110,000*l.* I stated at the commencement of this inquiry that I thought no part of the expense for the communication between Suez and India should fall upon Great Britain. It was and is still my opinion, that with the aid of the naval establishments actually entertained in India, the whole charge of the comprehensive scheme, if managed only with common prudence, would be defrayed by the returns. I shall now explain this opinion. In Bengal, the Indian government, as was stated by Mr. Peacock, maintain three steamers: of these, however, I know that two, having been built as war-steamers during the Burmese war, and being heavy vessels and slow, are not fit for the packet service, and would require to be replaced. I would propose to allot two of these to the packet establishment, the third being kept for the Government service in the Bay of Bengal. This would create a deduction of 40,000*l.* In the same way, I would apply the Indian navy, the expense of which in 1833 was estimated at 180,000*l.*, and is now, as we were told by Mr. Peacock or Mr. Melville, reduced to 100,000*l.* I would convert these into five steamers, allotting three to the packet service, and two for general service. I am of opinion that they should be all employed in their turn, so that they may be worn out gradually, in order to be replaced by others of improved construction. From these two sources I gain five vessels, or 100,000*l.*: the total deficit is 110,000*l.*; deduct five vessels from existing establishments, 100,000*l.*; remaining deficit, 10,000*l.* But there is also the King's navy, which at present is totally unemployed and maintained at a considerable expense. There can be no reason why a great steamer, capable of transporting troops or of tugging troop-ships, such as are attached to the naval force in the West Indies and the Mediterranean, should not also be added to the East India station; nor is there any reason why the Royal navy should not take its share of the duty in the Persian Gulf. Three successive admirals have entertained this opinion. In fact, the whole of the naval force in the East Indies should be consolidated into one, and placed under the Admiralty, by which all distinction of Company's and King's government would be done away with, much efficiency gained, and much money saved.

1939. Are those calculations founded upon such data as you think are fairly to be relied upon?—I think they are.

1940. Your Lordship has given a great deal of attention to this subject while you were in India?—I have.

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1941. Had you come to pretty much the same conclusions as are stated in that paper, with regard to that expense, when you were Governor-general of India?—No, I cannot say that I had.

1942. It is since your Lordship's arrival in England you have furnished yourself with the materials on which you have come to that conclusion?—Certainly.

1943. Has any portion of your opinion thereon been founded on the improved state of science, with reference to steam-boats?—Certainly, very much; I was not aware at all what steamers could do, till I came to ascertain the facts, and I have obtained more information during this inquiry than I possessed before.

1944. Your Lordship has stated that you think the Bombay marine should be altogether done away with, in order to devote whatever expense is now incurred for that object to the establishment of a steam communication?—Yes.

1945. One witness who has been examined on this Committee stated, that he thought that, in addition to the steam-boats that would be necessary for a flotilla, it would be advisable there should be a certain number of steamers, and a few only of the sailing vessels?—Two, he stated.

1946. Is your Lordship of opinion he is correct in that?—I do not conceive that the number he stated as necessary for the Persian Gulf to be correct, and I give this as a reason: he said that the four sailing vessels were sufficient for that purpose. Now, I conceive that a steamer and one vessel would be very much more efficient for the prevention of piracy than four common sailing vessels.

1497. Can your Lordship state any opinion as to the size of the steamers it would be advisable to employ in the Indian seas?—I should have them all of the same size as the Berenice; I think if they could be still larger it would be better. Her Majesty's steamer the Medea seems to be preferred by the best informed of the witnesses; but I am disposed to think that vessels of 1,000 tons would be the best adapted to this service; for convenience, certainly, of making the voyage under all circumstances; decidedly, for profit in the returns.

1948. Have the goodness to state whether you think the stations for the steam packets should be where the stations for the depôts of coal are?—The stations for the steam packets should be, starting from Calcutta, at Galle, Socotra, Mocha or Camaran. There might be subsidiary depôts of coal at the Maldives, at Perim, or any other intermediate port that might be determined on. I consider that Socotra should be the point of junction for the two vessels from Calcutta and Bombay.

1949. In what manner would you have the routes of the steam-boats divided; how far should one steam-boat go, and how far another?—It is the unanimous opinion of all the evidence that the steamers should be changed as often as possible. Therefore, the Calcutta steamer should not go further than Point de Galle; the Point de Galle steamer should be changed at Socotra; the Socotra steamer, at Camaran; in short, I would have three changes in the voyage.

1950. From your Lordship's experience, and your opportunities of inquiring when you were in India, and also in the passages you made on the Indian seas, connected with what you have since learned, you do not see any difficulties which may not be easily surmounted, with reference either to the ordinary state of navigation, or even the south-west monsoon?—When I was in India I certainly had doubts upon the subject; but since I have returned, and have made all the inquiries I have respecting it, and have ascertained what steamers with large tonnage and adequate power can effect, I do not think there is the least difficulty in the world. I think a voyage from Galle to Socotra, against the south-west monsoon, is more easy than that from Bombay to Socotra; but by running to the southward from Bombay, a steamer would fall exactly into the track of the Galle vessel. In point of time, the voyage round by Galle to Calcutta would be made in nearly the same as by sea from Socotra to Bombay, from thence overland to Calcutta; the route all the way by sea would perhaps be more regular and certain, because, during the monsoons, there are interruptions by land. The voyage by sea might perhaps be two, three or four days quicker; but I do not think it is a matter of any consequence. I think the advantage of the comprehensive plan is that, besides the general convenience, passengers would contribute a great proportion of the returns: a considerable part of the expense, even in the outset, would be paid from this source

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1951. Do you think that, supposing the scheme were carried into effect, the great mass of Europeans going to and returning from India would prefer the short to the long voyage round the Cape of Good Hope?—I have no doubt of it; I think also there would be a very considerable addition to the number of passengers; at present all the passengers to India come from the United Kingdom exclusively; whereas I conceive that, from the continent of Europe, and from the tide of travellers generally, you would have a very great addition of numbers by the Red Sea to visit India.

1952. Your Lordship was understood to say, on other occasions besides this, there is in India among the European residents universally, and partially among the natives, a very general demand for the establishment of this extended communication?—It is universal among Europeans, and has spread also among the natives. Half of the 30,000*l.* that was subscribed in India for the furtherance of steam navigation with England came from natives; and although a part of the sum may have been given by the persuasion of Europeans, still I believe a very considerable proportion of that flowed from their own conviction of the benefit India might derive from being brought into a closer connexion with England, both commercially and politically.

1953. If some such scheme as that you recommend should not be carried into effect, in your opinion a general dissatisfaction will ensue?—There is no doubt of it; and the subject has been entertained in India now during the last five years. For three years of that time I was in India, and I can state the very general and intense desire for it among all ranks and classes; and I may perhaps state here, that nobody was more anxious about it than the Bishop of Calcutta; it was his opinion that it would tend very much to the extension of Christianity in India, and the general improvement of India; that opinion he expressed at a public meeting, and he has frequently expressed the same opinion to myself.

Veneris, 14 die Julii, 1837.

MEMBERS PRESENT.

Mr. D. Barclay.
Right Hon. Lord William Bentinck.
Mr. Gordon.
Mr. Hutt.
Mr. Mullins.
Lord Sandon.

RIGHT HON. LORD WILLIAM BENTINCK, IN THE CHAIR.

The Right Hon. Lord *William Bentinck*, Chairman of the Committee, further Examined.

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1954. Lord *Sandon*.] DO you consider that a speedy and regular communication by steam with all the ports in India will be productive of any moral or political advantage?—Very many, and very great. With respect to the moral advantage, I have already had the occasion, in India, of publishing my opinion; and I will now repeat it. The subscribers to the Madras Steam Fund addressed me a letter, in 1834, in which they stated their belief that this project would confer vast and incalculable benefits upon our country and mankind. I answered as follows: "I confess that my anticipation of the expected benefit goes far beyond the more obvious results, great as those undoubtedly would be, of improved government, of the welfare of the people, as effected by such improvement, of the promotion of commerce, and of what may be considered of minor importance, of the comfort of our own numerous countrymen, separated by such great distance of time and place from all connexion with their dearest interests. The limit assigned by the resolution is expressed by the large term of 'mankind,' and in my judgment appropriately and correctly; because the great want of this eastern world, India, China, &c., may be comprehended in the single word, 'knowledge.' If the moral condition and happiness of the most enlightened countries suffer from this cause, it can be easily conceived, that on this great space, where the human mind has been buried for ages in

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universal darkness, the task must be hopeless, unless the same means which have alone accomplished the object elsewhere are brought into action, and these means increased and enforced with all the encouragement that the Government authority can bestow. I look to steam navigation as the great engine of working this moral improvement. In proportion as the communication between the two countries shall be facilitated and shortened, so will civilized Europe be approximated, as it were, to these benighted regions; and in no other way can improvement in any large stream be expected to flow in. Past experience shows what we have to expect for the future. I shall take the liberty of enlarging upon this topic. For much more than half a century the British dominion has been established at the three Presidencies, over a great extent of territory, with a large dependent population. Examining attentively the intellectual condition of these numerous communities, it cannot be denied that little progress comparatively has been made in the acquisition of useful knowledge. There prevail throughout, as in the darkest ages of European history, the same ignorance and superstition, the same belief in witchcraft, the same confidence in charms and incantations, the same faith in astrology and omens, the practice of human immolation of all sexes and ages, and many other barbarous customs, opposed to true happiness, and repugnant to the best feelings that Providence has planted in the human breast. Again also, in the arts and sciences, in every branch of useful attainment, the ancient usages and learning retain their unimpaired sway. In medicine and surgery, in chemistry, in hydraulics, in mechanics, in civil engineering, in painting, sculpture, and music, we observe them all, with the exception of a few individuals of superior talents and ambition, remaining stationary in their primitive rudeness and ignorance. And yet, during this long interval, thousands of well-educated Europeans, deeply versed in all these branches of knowledge, have been succeeding each other, and domiciliated for years in the country. Why, it will be asked, had all this science, this learning, and this ability to impart instruction, passed away without leaving any trace or impress on the mind of India, although in no other part of the world does there exist greater quickness of intellect, a more eager thirst after knowledge, or superior aptitude to acquire it? The answer to this question is plain and obvious. The cause is to be found in the past principle of our rule, of rigidly precluding the free admission of Europeans to India; the direct consequence of which, whatever in other respects may have been its advantages, has been to dam up in a great degree the main channel of improvement into India. It may be assumed that 19-20th parts of the importation of Europeans have consisted of the Company's servants; they have had, of course, other duties to perform occupying the whole of their time, and the fault lies not with them, if they have contributed little or nothing to this object. The government, indeed, may perhaps be accused of omission, and of not having done as much as they might; but I doubt, even with more exertion on their part, whether, while the [illegible], much progress could have been made. All the improvements of the description to which I have been adverting, are exclusively due to the skill and enterprise of individuals, aided by the capital of the houses of agency. Every indigo and coffee plantation, the Gloucester mills, the works of every description that are moved by steam, the iron foundries, the coal-mines worked after the European fashion, and the other great establishments that we see around us in Calcutta, are so many great schools of instruction, the founders of which are the real improvers of the country; it is from the same sources that we must expect other schoolmasters of new and improved industry. The new charter will remove many obstacles, but steam communication far more. But with the opinion I entertain, that the extent of colonization, (as it is mistermed,) and the effects of it, have been very much overrated, I am convinced that the knowledge and instruction so much needed by India can never be sufficiently provided by European colonists and speculators only. The natives themselves must be encouraged to go to Europe, there to study in the best schools of all the sciences. This opinion I know to be entertained by some of the intelligent members of a committee now sitting at Calcutta, to consider the best means of educating the natives in the higher branches of medicine and surgery. The Pacha of Egypt has given a noble example in this respect to the rulers of rude and unlearned nations. The circumstances that have hitherto operated as a complete barrier against the intercourse of the natives with Europe, except the classes of sailors and of menial servants, have

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have been, first, certain customs as to food prescribed by the Hindoo religion; and secondly, and mainly, the length, the expense and apprehension also of so long a voyage. In respect to the first of these obstacles, Rammohun Roy, who will be of illustrious memory among his posterity, has broken the ice; and I know that some, and I have no doubt that other, rich and well-educated natives are preparing to tread in his footsteps, with the same laudable desire of seeing what India may become, by what Europe, and especially England, is; and of raising their country by the same means from the moral and political degradation in which she is plunged. With respect to the second obstacle, which makes the attempt almost impossible to the great class of students, however willing, to those who are to be the practical operatives and the introducers of the new arts and sciences, and will become the best teachers of their countrymen, steam navigation, with the aid of Government, and of those interested in India's welfare, will go far to remove it. I was happy to learn from the same members of the medical committee, that natives thoroughly acquainted with the English language would, if assisted, be ready to embark immediately in that pursuit, and necessarily in others of the same utility. I will, therefore, conclude this too long detail by saying, that it is knowledge that is needed; knowledge is the beginning of wisdom; knowledge alone can raise this country to a higher standard among the nations of the world; and with the sentiments I have expressed, of the best and most effectual mode of attaining these great purposes, the steam committee are amply borne out, according to my firm conviction, in their resolution, 'that this project opens vast and incalculable benefits to our own country and to mankind.' The principal political advantages I will shortly state: First, great increase to our military power. The vast space we have to occupy and defend, and the consequent impossibility of quickly transporting troops from one point to another, has led to the necessity of having upon each portion of our territory a force sufficient for its protection, independent of all extraneous assistance. It is evident that, India forming a peninsula, and the monsoons offering no impediment to the access of steamers, large means of transport of this kind could always convey troops to the point menaced, and the whole army could thus be made available for the service of every portion of our dominions. The last overland mail brings an account of the arrival of the Atalanta at Bombay, and of her being dispatched three days afterwards with a whole native regiment to Mangalore, the seat of an insurrection. In Bengal, the river steamers will convey a reinforcement in three weeks, and safely, to Allahabad, situated at the junction of the Jumna and Ganges, and the central point of the upper and lower provinces of Bengal, which by the ordinary boats of the country could not have been done in less than as many months, and without much risk, the insurance to Allahabad being equal to that upon a whole voyage to England. When in India I recorded the opinion, which I repeat, that had the establishment of steamers now proposed been then in existence during the Burmese war, many thousand of lives, prodigious individual suffering, and millions of money, would have been saved to the state. It is not too much to assert, that under the peculiar local circumstances of India, with great space, no roads or canals, a very unhealthy climate, and with a sea-coast for its universal limit, one-fourth of the same military force, in co-operation with an adequate steam establishment, would be more efficient than the whole without it. If, moreover, the Pacha of Egypt could be induced, as some well-informed witnesses seem to consider practicable, to allow the passage of our troops through his country, a regiment or more from Malta might reach Bombay in five weeks. All this is power exercised in its most imposing character. Hyder Alli is said to have declared, that it was not what he saw, but what he did not see, that he was afraid of. I beg leave to put in an extract from a letter (*vide* Appendix) from the superintendent of steam vessels in the Ganges, upon the great success of that establishment, and as affording a certain degree of expectation of a similar result to the sea-going steamers. Secondly; the civil functionaries, who now come to India so young as to have acquired little European useful knowledge, and necessarily, from their position, too apt to contract arbitrary feelings and habits, would have easy means and should be encouraged to visit Europe, there to acquire liberal notions of the principles and practice of improved administration. Thirdly; the same salutary influence would operate upon our military officers. Subordination would be greatly promoted by the knowledge that the authority of the superior power at home could be quickly interposed; nor would

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courts martial have the same reluctance to do their duty, if all those considerations which distance so injuriously creates were removed. The comfort, the allegiance, the attachment of all to their native country would be more firmly maintained. Fourthly; but perhaps the most important benefit of all would be its tendency to place the security of our empire upon the only solid foundation, the general good will of those we govern. Our present position is this: we have conquered the whole of India; we have much above 100,000,000 of men under our direct and indirect rule; and it is universally allowed that our government has no hold upon the attachment of the people. I will introduce here, as more deserving the attention of the Committee than any opinion of my own, an extract from a minute of one of the most sagacious statesmen that India, or indeed any other country, has produced, the late Sir Thomas Munro, written in 1824, describing the effects of our government. 'If we make a summary comparison of the advantages and disadvantages which have occurred to the natives from our government, the result, I fear, will hardly be so much in its favour as it ought to have been. They are more secure from the calamities both of foreign war and internal commotion; their persons and property are more secure from violence; they cannot be wantonly punished, or their property seized by persons in power; and their taxation is on the whole lighter;' (my experience cannot confirm this latter opinion); 'but, on the other hand, they have no share in making laws for themselves, little in administering them, except in very subordinate offices;' (some amelioration has taken place in this latter respect, but not much;) 'they can rise to no high civil or military station; they are everywhere regarded as an inferior race, and oftener as vassals or servants than as the ancient owners and masters of the country.' This minute is full of able, wise and enlightened principles, and the same sentiments will be found to prevail in the recorded documents of two other most able and distinguished individuals, Sir John Malcolm, and the Hon. Mount Stuart Elphinstone. Sir Thomas Munro observes also, 'It is not the arbitrary power of a national sovereign, but subjugation to a foreign one, that destroys national character and extinguishes national spirit.' Successive foreign domination under Mahommedan emperors, for centuries, has been the sad lot of India; and it ought to have been a happy change in her fortunes, and no doubt will be, that she has become subject to a civilized, enlightened and Christian nation: but so far she has gained little by the transfer, except general peace and tranquillity, and the consequent capability of receiving the benefits of improved institutions and government. In many respects the Mahommedan surpassed our rule; they settled in the countries which they conquered; they intermixed and intermarried with the natives; they admitted them to all privileges, the interests and sympathies of the conquerors and conquered became identified. Our policy, on the contrary, has been the reverse of this; cold, selfish and unfeeling; the iron hand of power on the one side, monopoly and exclusion on the other. The bane of our system is not solely that the civil administration is entirely in the hands of foreigners; but that the holders of this monopoly, the patrons of these foreign agents, are those who exercise the directing power at home; that this directing power is exclusively paid by the patronage; that the value of this patronage depends exactly upon the degree in which all the honours and emoluments of the state are engrossed by their clients, to the exclusion of the natives. There exists, in consequence, on the part of the home authorities, an interest in respect to the administration precisely similar to what formerly prevailed as to commerce, directly opposed to the welfare of India; and consequently it will be remarked without surprise, that in the two renewals of the charter that have taken place within the last 25 years, in the first nothing was done to break down this administrative monopoly, and in the second, though a very important principle was declared, that no disability from holding office in respect to any subjects of the Crown, by reason of birth, religion, descent or colour, should any longer continue, still no provision was made for working it out; and, as far as is known, the enactment has remained till this day a dead letter. India, in order to become an attached dependency of Great Britain, must be governed for her own sake, not for the sake of the 800 or 1,000 individuals who are sent from England to make their fortunes. They are totally incompetent to the charge, and in their hands the administration, in all its civil branches, revenue, judicial, and police, has been a failure. Our government, to be secure, must be made popular, and to become so, it must consult the wel-

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fare of the many, and not of the few: the government must remain arbitrary, but it may also be, and should be, paternal. But how can this be effected? England has no knowledge of and no care for India. India, again, has no representatives in England, and has hitherto had no access to her shores; her fate is entirely in the hands of the two authorities with whom her management is vested. The Court of Directors seek their office for the sake of the patronage only; for the most part they are strangers to India; have their own separate affairs to manage; are divested of responsibility; but, from their permanency, and the knowledge which they derive from their numerous clients, they possess a power and influence over all affairs, which a temporary president of the Board of Control, unaided by any board possessing local information, cannot possibly control. It is much to be regretted, when the last charter was renewed, that these two bodies had not been amalgamated into one department, with a Secretary of State at its head, with a competent board like that of the Admiralty, possessing local experience and information; chosen, perhaps jointly, by the East India Company and the Crown, or Parliament, and paid out of the Indian revenues. It is through the means of a quick, safe and frequent communication between all India and England, that the natives of India in person will be enabled to bring their complaints and grievances before the authorities and the country; that large numbers of disinterested travellers will have it in their power to report to their countrymen at home the nature and circumstances of this distant portion of the empire. The result, I hope, will be to rouse the shameful apathy and indifference of Great Britain to the concerns of India; and by thus bringing the eye of the British public to bear upon India, it may be hoped that the desired amelioration may be accomplished. The following remark of Mr. Mill in his able history of India, is well suited to the present question: 'If the East India Company have been so little successful in ameliorating the practical operation of their government, it has been owing chiefly to the disadvantage of their situation, distant a voyage of several months from the scene of action, and to that imperfect knowledge which is common to them with all their countrymen.'"

APPENDIX.

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Appendix, No. 1.

PAPERS referred to in the Evidence of the Right Hon. Sir *John Hobhouse*, 15th June 1837.

(1.)

To *William Hutt*, Esq., M. P.

The REPORT of the Committee for promoting Steam Navigation with *India*.

Appendix, No. 1.

(1.)
Report of Committee for promoting Steam Navigation with India.

WITH reference to that part of the letter addressed to you by the Right Hon. Sir John Hobhouse, on the 27th August last, requiring that, "previously to giving any precise answer to the proposals made by the Company associated to promote steam navigation to India, it is indispensable that the King's Government and the Court of Directors should be made aware of the exact terms on which the Company intend to undertake the project in question," the provisional committee beg to report to you the plan and terms of the proposed undertaking, with a request that you will be kind enough to lay them before Sir John Hobhouse. The Company propose to despatch, monthly, from England a steam vessel, of competent power and size, to touch at Cadiz Gibraltar, Malta and Alexandria, taking to those places His Majesty's mail-bags, &c., as now performed by the Government vessels; the postage relating to those mails remaining, as at present, in the hands of His Majesty's Government. That the most efficient plan be adopted by the Company for the transmission of despatches, letters, &c. to India, across the Isthmus of Suez, to meet the proposed Company's vessels in the Red Sea, from whence, in the first instance, it is intended they should be forwarded to Bombay. That a vessel start also every month from Bombay to the Red Sea. That all Government despatches and letters to and from India, together also with a messenger, (if so required,) be taken free of every charge whatever, other than the general annual amount hereinafter stated; but all private letters, &c. be chargeable with a sea postage in favour of the Company, and the Company protected against private carriage of letters by parcels, &c., as exists in this country; the inland postage in respect of those letters to be in the hands of the Government. That the Government give the proposed Company a contract for a period of years to be agreed upon, and an annual sum of 40,000*l.* for performing the above services; the Company entering into a sufficient contract for the regular and proper fulfilment of their undertaking, subject to accustomed risks and liability. That the East India Company, in consideration of their despatches being carried by the proposed Company, pay 25,000*l.* per annum; a proper contract being also entered into with them for the fulfilment of the engagement.

The committee, anxious to afford every explanation to His Majesty's Government and the East India Company, have no hesitation in disclosing that their calculation of the expenses attending the performance of the undertaking, after allowing only 5*l.* per cent. on capital, amounts to the annual sum of

amounts to the annual sum of - - - - - - - - -	£.	136,500
Required of the Government, as above - - -	£. 40,000	
Ditto - - East India Company, ditto - -	" 25,000	
		65,000
Leaving a deficiency of - - - - - - - - -	£.	71,500

which the Company will defray. They will also find the necessary capital, which in the outset is estimated at 250,000*l.*; but, as the other presidencies are brought into the operation, an increased proportionate outlay will be required.

The provisional committee, in reply to that part of the letter of Sir J. Hobhouse requiring "that the Government should be made acquainted with the parties who are the *boná fide* members of the Company," have the pleasure of sending you a list of the parties who have already engaged to support this undertaking, embracing most of the principal houses connected with India in the city of London, to which place the measure has been as yet confined. The committee beg to explain to you, that the list of subscribers was only commenced on the 13th ultimo; that not an advertisement has been inserted to solicit subscriptions; that they have had to contend with a depressed state of the money market, and a period of the year when business is proverbially inactive. The committee have, however,

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(1.) Report of Committee for promoting Steam Navigation with India.

ever, the satisfaction of stating their conviction that every subscription will be paid up, and that the list is now in course of signature at Liverpool, Manchester, Dublin, Glasgow, Edinburgh, &c., as well as in London; and from the anxiety which has been manifested in those places, as also in India, the committee entertain no doubt of their capital being forthcoming in a limited time; but if the sanction of the Government and the East India Company were once avowed, there would be no difficulty, even under existing circumstances, in forthwith completing the subscription. It will be seen that the amount already subscribed is more than sufficient to enable the Company to proceed with the operation, if the committee should decide upon the chartering of vessels, instead of building, for a portion of the route at the commencement of the undertaking, a course which may be deemed advisable. The committee, in conclusion, trust, on consideration of all the circumstances, they will be entitled to the determination of His Majesty's Government and the East India Company, as kindly promised in the letter from the President of the Board of Control, before alluded to.

By order of the Provisional Committee,
Charles F. Head, Chairman.

(2.)

LETTER from *W. L. Maberly*, Esq., to the Earl of *Lichfield*, Postmaster-general.

(2.) Letter from W. L. Maberly, Esq.

My Lord, General Post-office, 3 February 1837.

I HAVE the honour to inform your Lordship that I have gone over the accompanying proposition from the Company associated to promote steam navigation to India, which has been transmitted by the Treasury for your Lordship's consideration.

The proposal of the Company stated shortly is, that they shall convey the correspondence of the kingdom, both public and private, to Bombay, by way of Alexandria and the Red Sea, by steamers, to be dispatched once a month from this country, and communicating with steamers stationed in the Red Sea, by overland conveyance across the Isthmus of Suez. For this service they demand a payment from the Government of 40,000 *l.* a year, and 25,000 *l.* from the East India Company; the remainder of the sum which they require to remunerate them, 71,500 *l.*, they expect to obtain by securing to themselves the monopoly of the sea postage on all private letters, the Company being protected against the carriage of letters by parcels in the same manner as the Post-office is at present. They propose also to carry mails to Cadiz, Gibraltar and Malta, thus superseding the regular packet to these places; but as I presume your Lordship will not go into the question with respect to its political importance, which is a matter rather for the consideration of the Government than the Post-office, I propose to confine the view I take of the subject to those points in which it concerns the Post-office as a revenue department, and to inquire what will be the gain and what will be the loss to the department if the proposition is adopted; thus treating it as a simple question of revenue.

Your Lordship is aware that the postage of letters to India is charged under a different Act of Parliament from that which regulates the postage of the kingdom generally; and as the great bulk of the correspondence to India is conveyed under the Act by private ship, it would be necessary, in order to come to a proper conclusion, that the Post-office should be aware what are the intentions of the Company with regard to the monopoly of sea postage which they demand, and whether they contemplate, by the expressions they have used, the withdrawal of the privileges of which the public are now in possession as to the conveyance of their letters to India.

In order, however, to test to its full extent the advantage to be derived from the proposition now submitted to your Lordship, I will assume that the Company intend to obtain a complete monopoly of the sea postage to India, and that the privilege of conveying letters by public or by private ships is to be enjoyed by them alone; it then remains to be determined how far their views of profit will be borne out by the actual amount of correspondence, and how far the sum of 136,500 *l.*, which they represent is absolutely necessary to be received to enable them to carry out their enterprise, is excessive or otherwise, as compared with that price which the Government, the East India Company and the public now pay for the execution of the service.

By returns which I have caused to be made out, and which are enclosed, the amount of postage of letters passing through Falmouth by the Mediterranean packet, for Cadiz, Gibraltar, Malta and Corfu, was, in 1834, 2,785 *l.*, in 1835, 3,507 *l.*, and in 1836, 3,411 *l.*; and on letters for India and Alexandria, for 1836, 2,275 *l.*; making an average of the whole on a year of 5,509 *l.*; and as we may fairly presume the letters received by this conveyance would equal in number those sent from England, this sum would be doubled, and the total amount of the correspondence carried by the Mediterranean packet may be taken at the present day at 11,018 *l.* for a year.

It is to be recollected that we have no means of ascertaining the number of franks; assuming it, however, at a fifth of the whole correspondence, (which would be a very high average,)

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(2.)
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average,) it would amount to 2,203 *l.* in addition, making the outside correspondence by the packet 13,000 *l.*

This is only the amount that is carried by the packet; there remains to be added to it that number of letters which are taken by private ships, under the 59 Geo. 3, c. 111, and which form by far the greater portion of the correspondence between this country and India. Your Lordship is aware that, by the provisions of this Act, there is no necessity to forward letters to India through the Post-office; and the return, therefore, which is enclosed, of letters sent to India by private ships from the Post-office, will afford no adequate idea of the number of letters. As, however, all letters on their being landed from India are forced by law to be brought to the Post-office, with the exception of the letters to the Government departments and the East India-house, which are sent in boxes, and of which the number cannot be accurately known, and also those of owners and consignees, which they may receive without the intervention of the Post-office, under certain limitations, the amount of return postage to England from India will afford a tolerably fair criterion of the correspondence by private ship as it exists at present. The amount, as given in the annexed return, which has been carefully prepared in the Ship-letter Office, shows a sum of 13,500 *l.* in round numbers, which, doubled in the same way as before, on a supposition of the letters sent being equal in number to those which have been received, makes a total of 27,000 *l.* To this, if we add a fourth for letters not bearing postage, as it is necessary to take a larger proportion in this than in the case of the packets, in order to include those of consignees, we have a total of 33,750 *l.* as the value of the correspondence by private ships. I have before shown that the correspondence by packet may be taken at 13,000 *l.* in round numbers; the total amount of postage, therefore, by packet and private ships combined, whether paid by Government or by the public, may be estimated at 46,750 *l.*

Perhaps in stating this sum I have made too high an estimate, inasmuch as the rate of ship postage to India being only 2 *d.*, while that from India is 4 *d.*, for sea conveyance, in taking the letters from India as my basis on which to form a calculation of the amount of correspondence, the sea postage on letters to India is overstated one-half, 4 *d.* being assumed, instead of 2 *d.*; but as this amount would be small as compared with the inland postage, I have thought it better to leave it as it is, rather than complicate the subject with matters which would not materially affect the question.

This sum of 46,750 *l.* is the whole amount of postage to and from India and the parts in the Mediterranean alluded to, and includes, as your Lordship will perceive, both the inland and the sea postage.

But, by the plan referred to you by the Treasury, you will see that the Company purpose to leave the inland postage in the hands of the Government; and this amount, therefore, has to be separated from the 46,750 *l.*, the total value of the correspondence as it at present exists. On the first portion of this sum, the 13,000 *l.*, conveyed by packet, the inland postage cannot be given, the packet rate being a fixed sum, and combining both charges together, so as to give us no means of dividing them. With regard to ship letters, however, the inspector of those letters informs me that, taking one with another, on the average, the rates of 2 *d.* and 4 *d.* on the numbers conveyed will afford a very fair estimate of the amount of sea postage; and the actual number being about 150,000, the sea postage, inwards and outwards, of 4 *d.* and 2 *d.* respectively, is 3,750 *l.*, to which add a fourth for franks, 937 *l.*, and we have a total amount of 4,700 *l.* in round numbers. This, therefore, would be the sum the Company would receive, in addition to the packet postage, 13,000 *l.*: though it appears to me that the Government could not allow them to receive the whole of this sum, inasmuch as I have before stated it includes inland as well as sea postage; but even supposing they did, these two amounts combined, 17,700 *l.*, would be the whole the Company would receive for the complete monopoly of the postage to India as it at present exists, after the repeal of the India Act, and the abolition of those privileges of which the public have been so long possessed.

The sum of 17,700 *l.* being the whole amount of the postage by sea, supposing that no official correspondence went free, I think I am taking an exaggerated estimate of the cost to the Government and the East India Company of the conveyance of their correspondence at present, in assuming it to be a fourth of this amount, viz. 4,500 *l.*; and the Company having proposed that they should receive the sum of 40,000 *l.* from the Government, and 25,000 *l.* from the East India Company, for the execution of this duty, I need not point out to your Lordship how enormous this demand is, as compared with the value of the service to be performed, and how impossible it is that the Government, looking at it as a revenue question, could for a moment entertain the proposition. It should, however, in fairness, be stated, that the Mediterranean packet would be no longer necessary, and that this expense, whatever it is, would be saved; and to this extent the Company would seem entitled to credit, as relieving the Government from expense: still, on the other hand, as the packet postage amounts to 13,000 *l.*, that sum should be taken in diminution of the saving, which in reality is only the difference between 13,000 *l.* and the actual cost of the packets, whatever it may now be, which we have no means of ascertaining.

Your Lordship will at once perceive, that if it is impossible to entertain this proposition as regards the Government and the East India Company, it is equally impolitic that it should be carried into execution as regards the public. The whole of the sea postage at present paid, both by Government, the East India Company and the public, it has been

seen

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(2.)
Letter from
W. L. Maberly, Esq.

seen amounts to 17,700 *l.*; while the Company estimate in their calculation that they cannot convey the correspondence profitably under an expenditure of 131,000 *l.*, of which 71,000 *l.* is to be paid by private individuals. As 13,200 *l.* is the sum now paid, viz., what remains after deducting 4,500 *l.*, the cost of the correspondence of the Government and the East India Company, the public must be made to pay the difference between this and 71,500 *l.*, viz. 58,300 *l.*, in the shape of additional postage, in order to enable the Company to carry their project into execution; in other words, the rate of postage must be increased 450 per cent.; and it will be for your Lordship to decide whether the expedition with which part of the letters would be conveyed (it will not be applicable to all) would counterbalance, in the opinion of the public, such an enormous increase of taxation. I have said it would not be applicable to all, inasmuch as the letters to the Mediterranean would not be accelerated at all; while I doubt whether those to Calcutta and Madras would arrive at a much earlier period than the letters sent direct to those ports by private ships. My own opinion is, that, instead of there being an increase, there would be a falling off, that the revenue would be largely defrauded, and that the public, while they availed themselves to a very small degree of the more expeditious means of conveyance, would complain, and not without great justice, of the abolition of the privileges they have enjoyed for so long a period of time.

Your Lordship will perceive how insignificant the results would be, on the supposition that the Company possessed a complete monopoly, and that on any other supposition than this the project is altogether fallacious. I have no reason to imagine that they contemplated such a monopoly, but have been anxious to make the calculation in the manner most favourable to them; and if such are the results, viewing it in this light, I leave your Lordship to judge how utterly hopeless they must be, if the India Act remain unrepealed. However great, therefore, the advantage to be derived from the proposition made by the Company, in a political point of view, as a Post-office question I cannot recommend your Lordship to entertain it, inasmuch as it cannot be profitable to the Company undertaking it, and would be a never-failing source of complaint with the public, from the withdrawal of their privileges, while the sum that is demanded from the Government is altogether out of proportion with the value of the service to be performed, and the cost at which it is at present executed.

All which is humbly submitted by

(signed) *W. L. Maberly.*

P. S.—I have not included in these calculations the ship letters landed in Ireland or Scotland. In the former they amounted in the last year to 2,419 *l.*; the sea postage on which would be about 33 *l.* In Scotland the India letters are not kept separate from the others, and no account can be given; but it is perfectly clear that the amount, whatever it is, must be so insignificant as not to affect in the slightest degree the calculation I have made.

(3.)

(3.)
Postage of Letters
passing through
Falmouth.

AN ACCOUNT of the POSTAGE of LETTERS passing through *Falmouth* by the Mediterranean Packet.

	Year ended October 1834. £.	s.	d.	Year ended October 1835. £.	s.	d.	Year ended October 1836. £.	s.	d.
Cadiz - - - - - -	820	11	5	811	19	6½	703	8	3
Gibraltar - - - - - -	1,114	17	11	1,603	18	-	1,527	14	8½
Malta - - - - - -	549	19	2	670	4	11½	694	2	6½
Corfu - - - - - -	300	9	8	421	14	10	486	8	10
£.	2,785	18	2	3,507	17	4	3,411	14	4

	£.	s.	d.
Amount of Letters for India in year ended October 1836 - - - -	990	7	4
Ditto - - - Alexandria - - - ditto - - - - - -	1,285	1	1
£.	2,275	8	5

The average time occupied in conveying the Mail from Falmouth to Alexandria is about 24 days.

Appendix, No. 1.

(4.)
Letters, &c. received by Private Ships.

(4.)

A RETURN of the Number and Amount of Letters and Newspapers received by Private Ships from the Island of *Ceylon*, and the Three Presidencies of *Bombay*, *Madras* and *Calcutta*, in the Three Years ending 5th October 1834, 1835 and 1836.

——	1834.				1835.				1836.			
	No.	£.	s.	d.	No.	£.	s.	d.	No.	£.	s.	d.
CEYLON:												
Letters - - - -	4,952	516	12	9	3,269	292	12	–	5,667	591	16	7
Soldiers and seamen -	584	7	6	–	370	4	12	6	650	8	2	6
Newspapers - - -	490	12	13	–	389	10	13	–	667	5	9	1
Franks - - - - -	253	-	-	-	176	-	-	-	294	—		
	6,279	536	11	9	4,204	307	17	6	7,278	605	8	2
BOMBAY:												
Letters - - - -	29,583	2,613	5	5	34,913	2,840	3	9	27,914	2,324	16	–
Soldiers and seamen -	2,924	36	11	–	1,879	23	9	9	1,810	22	12	6
Newspapers - - -	1,477	38	1	3	1,800	46	7	3	1,566	19	2	4
Franks - - - -	1,552	-	-	-	1,883	-	-	-	2,016	—		
	35,536	2,687	17	8	40,505	2,910	–	9	33,306	2,366	10	10
MADRAS:												
Letters - - - -	23,211	2,497	4	10	29,189	2,682	19	10	29,424	2,744	3	8
Soldiers and seamen -	3,205	40	1	3	4,861	60	15	3	5,105	63	16	3
Newspapers - - -	1,737	44	6	3	2,167	56	3	6	2,642	24	7	9
Franks - - - -	1,218	-	-	-	1,521	-	-	-	1,549	—		
	29,371	2,581	12	4	37,738	2,799	18	7	38,720	2,832	7	8
CALCUTTA:												
Letters - - - -	74,513	7,152	13	5	72,955	6,446	12	1	86,499	7,548	12	4
Soldiers and seamen -	3,498	43	14	6	2,205	27	11	3	2,291	28	12	9
Newspapers - - -	5,816	149	3	–	5,899	151	–	9	7,774	68	7	1
Franks - - - -	3,920	-	-	-	3,835	-	-	-	4,047	—		
	87,747	7,345	10	11	84,894	6,625	4	1	100,611	7,645	12	2
TOTAL:												
Letters - - - -	132,259	12,779	16	5	140,356	12,262	7	8	149,504	13,209	8	7
Soldiers and seamen -	10,211	127	12	9	9,315	116	8	9	9,856	123	4	–
Newspapers - - -	9,520	244	3	6	10,255	264	4	6	12,649	117	6	3
Franks - - - -	6,943	-	-	-	7,415	-	-	-	7,906	—		
	158,933	13,151	12	8	167,341	12,643	–	11	179,915	13,449	18	10

Ship Letter Office,
13 Jan. 1837.

(signed) *G. R. Huddlestone*,
Inspector.

(5.)
Letters, &c. sent by Private Ships.

(5.)

A RETURN of the Number and Amount of Letters and Newspapers sent by Private Ships to the Island of *Ceylon*, and the Three Presidencies of *Bombay*, *Madras* and *Calcutta*, in the Three Years ending 5th October 1834, 1835, 1836.

——	1834.				1835.				1836.			
	No.	£.	s.	d.	No.	£.	s.	d.	No.	£.	s.	d.
CEYLON:												
Letters - - - -	1,184	62	18	3 ½	1,225	58	6	7	1,362	70	9	6
Soldiers and seamen -	2,984	12	8	8	2,878	11	19	10	2,730	11	7	6
Newspapers - - -	2,850	22	18	9	2,926	21	18	9 ½	4,042	26	6	5 ½
Franks - - - -	1,621	-	-	-	1,297	-	-	-	1,539	—		
	8,639	98	5	8 ½	8,326	92	5	2 ½	9,673	108	3	5 ½

(continued)

Appendix, No. 1.

(5.)
Letters, &c. sent by Private Ships.

—	1834.				1835.				1836.			
	No.	£.	s.	d.	No.	£.	s.	d.	No.	£.	s.	d.
BOMBAY:												
Letters - - - -	5,504	319	1	4½	5,054	319	5	4½	5,125	301	6	10
Soldiers and seamen -	3,115	12	19	7	3,571	14	17	7	3,370	14	–	10
Newspapers - - -	14,534	99	12	1	15,108	105	10	9	14,660	125	19	8
Franks - - - -	973	-	-	-	1,129	-	-	-	923	—		
	24,126	431	13	–½	24,862	439	13	8½	24,078	441	7	4
MADRAS:												
Letters - - - -	9,254	529	11	10	9,101	509	11	–½	8,577	476	3	6
Soldiers and seamen -	5,564	23	3	8	4,914	20	9	6	5,154	21	9	6
Newspapers - - -	18,493	141	9	11½	19,347	142	13	5	20,012	132	10	–½
Franks - - - -	1,974	-	-	-	1,888	-	-	-	1,727	—		
	35,285	694	5	5½	35,250	672	13	11½	35,470	630	3	–½
CALCUTTA:												
Letters - - - -	14,314	873	18	6	13,207	776	10	4	14,132	834	18	9
Soldiers and seamen -	6,663	27	15	3	6,906	28	15	6	7,166	29	17	2
Newspapers - - -	14,504	108	13	–	16,297	113	10	6	19,406	123	2	11½
Franks - - - -	2,208	-	-	-	1,931	-	-	-	2,008	- -		
	37,689	1,010	6	9	38,341	918	16	4	42,712	987	18	10½
TOTAL:												
Letters - - - -	30,256	1,785	10	–	28,587	1,663	13	4	29,196	1,682	18	7
Soldiers and seamen -	18,326	76	7	2	18,269	76	2	5	18,420	76	15	–
Newspapers - - -	50,381	372	13	9½	53,678	383	13	5½	58,120	407	19	1½
Franks - - - -	6,776	-	-	-	6,245	-	-	-	6,197	—		
	105,739	2,234	10	11½	106,779	2,123	9	2½	111,933	2,167	12	8½

(6.)
Despatches sent and received by Private Ships.

(6.)

A RETURN of the Number of Bags and Boxes of Despatches sent to and received from *Ceylon*, *Bombay*, *Madras* and *Calcutta*, by Private Ships, in the Three Years ending 5th October 1834, 1835, 1836.

—	1834.			1835.			1836.		
	Bags.	Boxes.	Supposed Number of Letters.	Bags.	Boxes.	Supposed Number of Letters.	Bags.	Boxes.	Supposed Number of Letters.
Outward -	13	-	910	13	-	910	14	-	980
Inward - -	25	34	4,130	22	38	4,200	24	37	4,270

Ship Letter Office,
17 Jan. 1837.

(signed) *G. R. Huddleston*,
Inspector.

(7.)
Letters landed in Ireland.

(7.)

A RETURN of the Number and Amount of Letters landed at the Ports in *Ireland*, from the Presidencies in *India*, viz. *Madras*, *Bombay*, *Calcutta* and *Ceylon*, for One Year, ended 5th January 1837.

—	NUMBER.	AMOUNT
Madras - - - - -	—	—
Bombay - - - - -	1,332	—
Calcutta - - - - -	1,087	—
Ceylon - - - - -	—	—
	2,419	—

(signed) *Anthony Lyster.*

Note.—The postage cannot be stated, as they all appear to have been "forward letters," with very few exceptions.

(8.)
Mr. Calvert's
Proposition.

(8.)

Mr. Calvert's proposition is, that His Majesty's Government shall establish steamers between Marseilles, Malta and the Levant, in opposition (as it may be inferred) to a similar establishment which has been sanctioned and is to be carried into effect by the French government.

Without reference to the nationality of the vessels to be employed on the new station, the advantages proposed to Great Britain, by sending British correspondence *via* Marseilles, instead of continuing the present arrangement by steamer from Falmouth through the Straits of Gibraltar, appear to be the following:

1st. Expediting the conveyance of correspondence from London to Malta by 10 days, or one-half the present time, so that answers may be received in London from Malta in 24 days, instead of 56 days,* making a difference of 32 days.

2d. The advantage gained by the saving of ten days' time to Malta will be felt in the further conveyance of correspondence either to Greece, Turkey, Syria, Egypt and India; and although it is not held out that answers can be received from these places in an equal ratio of speed, unless an additional number of steamers be employed, yet the increased rapidity in the transmission of correspondence from London will be of material importance to British interests, both at home and at the place of destination. But Mr. Calvert proposes to extend his plan, and ensure a speedy and regular conveyance of correspondence between Malta and Athens and Constantinople, so that letters should reach Athens from London in 14 days, and Constantinople in 17 days, answers from both places being received in London in 41 days.

In this way the letters to Constantinople would avoid the continental post-offices.

3d. Besides the saving of time in sending to and from India, to which Mr. Calvert draws especial attention, on account of the importance of reducing in point of time the distance between Great Britain and our oriental possessions, he assumes that greater certainty in the amount of time will be ensured by the new arrangement, and that the object for which a steamer has been established at great expense on the Red Sea, namely, the acceleration of the communication with India, will thus be materially promoted.

4th. It is stated that by abolishing the present steamers from Falmouth, and sending the mail (by messenger) through France, a great saving of expense will be effected.

This messenger, therefore, must be a post-office messenger, and not the "*courier de cabinet*," known abroad. A question appears to arise on this point, whether such an arrangement would be permitted by a foreign government. It would be, in fact, a British transit post through France, independent of the French post-office.

It may here be observed, however, that the French plan is to make Malta the central point of rendezvous of their several steamers; and in such case, if the French letters do not go through the Malta post-office, the French mail will pass in transit through Malta, which is what Mr. Calvert proposes for the British mail through France.

5th. Unless the new plan of transmission from London be adopted, London merchants may suffer materially from the greater rapidity with which intelligence will be conveyed from the continent to the correspondents of foreign houses in the ports of destination than that from hence, unless London merchants send by the French conveyance, and then the British revenue would suffer.

6th. Passengers going to Malta from Marseilles will avoid the quarantine which is now imposed at Malta on arrivals from Gibraltar,† in consequence of the free communication between Gibraltar and Barbary.

It appears, upon a review of Mr. Calvert's plan, that several advantages might be derived if the Marseilles route could be adopted; but such an arrangement could of course only last during peace with France; and in the event of a rupture with that country the old plan must be resumed.

France will in the mean time acquire a considerable increase in the numbers and experience of her steam navy. It has been suggested, that it is with this view that the French government has undertaken the project. On the other hand, the regular conveyance of despatches direct to Constantinople by steam might be of great advantage in the event of any rupture with other continental powers, so long as France and England remain allies.

It is not exactly shown why, as may be inferred, the British arrangement should be rather an opposition plan, than one in conjunction with the French plan. If it is in opposition, every obstacle will naturally be thrown in its way by France; whereas, if the two countries acted conjointly in this matter, to which it may be supposed that there can be little objection, greater advantage and speed would be insured. This part of the plan is not sufficiently explained, and the Foreign office cannot judge as to the details respecting expense and time, which are Admiralty and Post-office questions.

But there are sufficient grounds for referring the paper to both those departments for consideration and opinion.

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* The Post-office, however, only estimate it at 53 days.

† The Falmouth steamer always touches at Gibraltar.

(9.)

TABLE showing the Organization of the Packet Service, the Postage of Letters so transmitted, and the Rate of Postage per Head.

1.	2.	3*.	4.	5.		6.		7.	8.	9.	10.		
PLACES OF								Price of Passage per Head.			Day and Hour of the Arrival and Sailing of the Packets in each Column.		
Departure.	Destination.	Postage of a Single Letter.	Distance by Sea.	Time (excluding delays.)		Average Stay at Points of Destination.		First Class.	Second Class.	Third Class.			
		Fr.	Leag.	Da.	Hs.	Da.	Hs.	Fr.	Fr.	Fr.			
Alexandria.	Athens - -	1	173	3	2	–	14	156	104	52			
	Civita Vecchia -	2	481	8	14	–	6	433	289	144			
	Constantinople -	1	283	5	5	1	15	255	170	85			
	Livourne - -	2	519	9	16	–	7	467	311	156	Boat from Syra	Reaches Alexandria	The 4, 14 and 24 of each month, at 10 P.M.
	Malta - -	2	322	5	18	–	–	290	193	97			
	Marseilles -	2	598	10	16	–	–	538	359	179		Leaves Alexandria	The 6, 16 and 26 of each month, at 4 P.M.
	Naples - -	2	431	7	17	–	6	388	259	129			
	Smyrna - -	1	200	3	13	1		180	120	60			
	Syra - -	1	150	2	16	–	12	135	90	45			
Athens.	Alexandria -	1	173	3	2	1	18	156	104	52			
	Civita Vecchia -	1	351	6	8	–	6	319	212	106			
	Constantinople -	1	156	2	23	1	15	140	94	47			
	Livourne - -	1	392	7	–	–	7	353	235	118	Boat from Syra	Reaches Athens	The 10, 20 and 30 of each month, at 6 A.M.
	Malta - -	1	195	3	12	–	–	176	117	59		Leaves Athens	The 10, 20 and 30 of each month, at 8 P.M.
	Marseilles -	2	474	8	10	–	–	424	283	141			
	Naples - -	1	304	5	11	–	6	274	182	91			
	Smyrna - -	1	73	1	7	1	–	66	44	22			
	Syra - -	1	23	–	10		12	21	14	7			
Civita Vecchia.	Alexandria -	●	481	8	14	1	18	433	289	144	Boat from France	Reaches Civita Vecchia	The 1, 11 and 21 of each month, at 3 A.M.
	Civita Vecchia -	1	351	6	8		14	319	212	106			
	Constantinople -	2	474	8	11	1	15	427	284	142		Leaves Civita Vecchia	The 1, 11 and 21 of each month, at 10 A.M.
	Livourne - -	1	38	–	16		7	34	23	11			
	Malta - -	1	159	2	20	1	–	143	95	48	Boat from Constantinople	Reaches Civita Vecchia	The 2, 12 and 22 of each month, at noon.
	Marseilles -	1	117	2	2	–	–	105	70	35			
	Naples - -	1	50	–	21	–	6	45	30	15		Leaves Civita Vecchia	The 2, 12 and 22 of each month, at 6 P.M.
	Smyrna - -	2	381	6	10	1	–	543	229	114			
	Syra - -	1	331	5	22	–	12	298	199	99			
Constantinople.	Alexandria -	1	283	5	5	1	18	255	170	85			
	Athens - -	1	156	2	23	–	14	140	94	47			
	Civita Vecchia -	2	474	8	11	–	6	427	284	142			
	Livourne - -	2	312	9	3	–	7	461	307	151	Boat from France	Reaches Constantinople	The 5, 15 and 25 of each month, at 9 A.M.
	Malta - -	2	315	5	15	–	–	284	189	95			
	Marseilles -	2	591	10	13	–	–	532	355	177		Leaves Constantinople	The 6, 16 and 26 of each month, at midnight.
	Naples - -	1	424	7	11	–	6	382	251	127			
	Smyrna - -	1	93	1	16	2	–	84	56	28			
	Syra - -	1	133	2	13	–	12	120	80	40			
Livourne.	Alexandria -	2	519	9	16	1	18	467	311	156			
	Athens - -	1	392	7	–	–	14	353	235	118	Boat from France	Reaches Livourne	The 3, 13 and 23 of each month, at 3 A.M.
	Civita Vecchia -	1	38	–	16	–	8	34	23	11			
	Constantinople -	2	512	9	3	1	15	461	307	151		Leaves Livourne	The 3, 13 and 23 of each month, at 10 A.M.
	Malta - -	1	197	3	12	1	–	177	118	59	Boat from Constantinople	Reaches Livourne	The 3, 13 and 23 of each month, at 10 A.M.
	Marseilles -	1	79	1	10	–	–	71	47	24			
	Naples - -	1	88	1	13	–	6	79	53	26		Leaves Livourne	The 3, 13 and 23 of each month, at 5 P.M.
	Smyrna - -	2	429	7	11	1	–	377	251	126			
	Syra - -	2	319	6	14	–	12	332	221	111			
Malta.	Alexandria -	2	322	5	18	1	18	290	193	97	Boat from France	Reaches Malta	The 7, 17 and 27 of each month, at noon.
	Athens - -	1	195	3	12	–	14	176	117	59			
	Civita Vecchia -	1	159	2	20	–	6	143	95	48		Leaves Malta	The 8, 18 and 28 of each month, at noon.
	Constantinople -	2	315	5	15	1	15	284	189	95			
	Livourne - -	1	197	3	12	–	7	177	118	59	Boat from Constantinople	Reaches Malta	The 4, 14 and 24 of each month, at 10 P.M.
	Marseilles -	1	276	4	22	–	–	248	166	83			
	Naples - -	1	109	1	23	–	6	98	65	33		Leaves Malta	The 9, 19 and 29 of each month, at 10 A.M.
	Smyrna - -	1	222	3	13	1	–	200	134	67			
	Syra - -	1	172	3	2	–	12	155	103	52			
Marseilles.	Alexandria -	2	598	10	16	1	18	538	559	179			
	Athens - -	2	474	8	10	–	14	424	283	141			
	Civita Vecchia -	1	117	2	2	–	8	105	71	35		Reaches Marseilles	The 5, 15 and 25 of each month, at 7 A.M.
	Constantinople -	2	591	10	13	1	15	532	355	177	Boat from Constantinople		
	Livourne - -	1	79	1	10	1	7	71	47	24		Leaves Marseilles	The 1, 11 and 21 of each month, at 5 P.M.
	Malta - -	1	276	4	22	1	–	248	166	134			
	Naples - -	1	107	2	23	–	6	150	100	50			
	Smyrna - -	2	498	8	21	1	–	448	299	149			
	Syra - -	2	448	8	–	–	12	403	269	134			

2. PLACES OF par- ure.	2. PLACES OF Destination.	3*. Postage of a Single Letter.	4. Distance by Sea.	5. Time (excluding delays.)		6. Average Stay at Points of Destination.		7. Price of Passage per Head. First Class.	8. Price of Passage per Head. Second Class.	9. Price of Passage per Head. Third Class.
		Fr.	Leag.	Da.	Hs.	Da.	Hs.	Fr.	Fr.	Fr.
Naples.	Alexandria	2	431	7	17	1	18	388	259	129
	Athens	1	304	5	11	–	14	271	182	91
	Civita Vecchia	1	50	–	21	–	6	45	30	15
	Constantinople	1	421	7	14	1	15	382	254	127
	Livourne	1	88	1	13	–	7	79	53	26
	Malta	1	109	1	23	-	-	98	65	33
	Marseilles	1	167	2	23	-	-	150	100	50
	Smyrna	1	331	5	22	1	-	298	199	99
	Syra	1	281	5	1	–	12	253	160	84
Smyrna.	Alexandria	1	200	3	15	1	18	180	120	60
	Athens	1	73	1	7	-	11	66	44	22
	Civita Vecchia	2	381	6	19	–	6	343	229	111
	Constantinople	1	93	1	16	1	15	84	56	28
	Livourne	2	419	7	11	–	7	377	251	126
	Malta	1	222	3	13	-	-	200	133	67
	Marseilles	2	498	8	21	-	-	449	299	149
	Naples	1	331	5	22		6	298	199	99
	Syra	1	50	–	21	–	12	45	30	15
Syra.	Alexandria	1	150	2	16	1	18	135	90	45
	Athens	1	23	-	10	–	11	21	14	7
	Civita Vecchia	1	331	5	22		6	298	199	99
	Constantinople	1	133	2	15	1	15	120	80	40
	Livourne	2	369	6	11		7	332	221	111
	Malta	1	172	3	2	-	-	155	103	52
	Marseilles	2	418	8		-	-	403	269	134
	Naples	1	281	5	1		6	253	169	84
	Smyrna	1	50	–	21	1	-	45	30	15

2. PLACES OF par- ure.	10. Day and Hour of the Arrival and Sailing of the Packets in each Column.		
Naples.	Boat from France	Reaches Naples	The 5, 15 and 25 of each month, at 7 A.M.
		Leaves Naples	The 1, 11 and 21 of each month, at 1 P.M.
	Boat from Constantinople	Reaches Naples	The 1, 11 and 21 of each month, at 9 A.M.
		Leaves Naples	The 1, 11 and 21 of each month, at 3 P.M.
Smyrna.	Boat from France	Reaches Smyrna	The 2, 12 and 22 of each month, at 5 P.M.
		Leaves Smyrna	The 3, 13 and 23 of each month, at 5 P.M.
	Boat from Constantinople	Reaches Smyrna	The 8, 18 and 28 of each month, at 5 P.M.
		Leaves Smyrna	The 10, 20 and 30 of each month, at 5 P.M.
Syra.	Boat from France	Reaches Syra	The 1, 11 and 21 at 2 P.M.
		Leaves Syra	The 1, 11 and 21 at 8 P.M.
	Boat from Constantinople	Reaches Syra	The 1, 11 and 21 at 2 P.M.
		Leaves Syra	The 1, 11 and 21 at 8 P.M.
	Boat from Athens	Reaches Syra	The 1, 11 and 21 at 6 A.M.
		Leaves Syra	The 9, 19 and 29 at 8 P.M.
	Boat from Alexandria	Reaches Syra	The 9, 19 and 29 at 8 P.M.
		Leaves Syra	The 2, 12 and 22 at 6 A.M.

Note. The Postage noted in Column 3 is regulated according to the distance marked to the right by the Act of the 3d July 1835, which fixes it at 1 franc on all distances not exceeding 250 leagues, and at 2 francs on distances above 250 and not exceeding 500 leagues.

OBSERVATIONS.

Regulations for Letters, &c.		French Letters to Alexandria, Constantinople, Smyrna, and reciprocally, may be forwarded without being paid. All Letters to Italy, Malta and Greece must be paid. Newspapers, Pamphlets, Letters of Advice, in French or foreign print, pay for their Conveyance by Sea four times the postage fixed by the Acts of 15 March 1827 and 14 December 1830, on account of their transit through French territory.
Regulations for Passengers, &c.	Passengers' Luggage.	Each passenger is allowed a fixed quantity of luggage, according to the following scale: 75 kilogrammes to passengers of the first class. 50 - ditto - - ditto - second ditto. 25 - ditto - - ditto - third ditto. When a passenger's luggage exceeds that laid down in the scale, there is a duty of 2 cents. for every 10 kilogrammes of excess for every league by sea, in no case may a passenger's luggage exceed 300 kils. The effects of passengers should be contained in trunks, bags or portmanteaus with the name and place of destination inscribed outside.
	Children.	Children under 10, accompanying a passenger of the first class, pay the second class fare; those accompanying a passenger of the second class pay the third class fare, and those of the third class are charged half price.
	Servants.	Maid servants pay second class fare. Men servants pay third class fare.
	Carriages.	Carriages with four wheels pay as a first class passenger; ditto with two wheels as a second class passenger.
	Dogs.	Dogs tied up on deck pay 10 francs for distances not exceeding 200 leagues, and 20 francs for all other distances.

Appendix, No. 1.

(10.)

Statement of the size, &c. of the Company's Steamers Atalanta and Berenice.

(10.)

STATEMENT of the SIZE, HORSE POWER and GUNS of the Company's Steamers ATALANTA and BERENICE.

Atalanta.

Size: 616 tons builders' measurement, or 389 tons registered tonnage on the new system of measurement, which excludes the dimensions of the engine-room.

Horse-power: Each engine, 105.

Guns: One long gun, to throw a hollow shot of 48 lbs., and four of Dickson's 32-pounders.

Berenice.

Size: 664 $\frac{1}{94}$ tons builders' measurement, or 457 tons registered tons as above.

Horse-power: Each engine, 115.

Guns: One long gun, as above, and two of Dickson's 32-pounders.

Public Department, 14 June 1837. *C. H.*, C. P.

Appendix, No. 2.

The Rail from Cairo to Suez, surveyed by Galloway Bey in 1834.

Appendix, No. 2.

The Rail from *Cairo* to *Suez*, surveyed by *Galloway Bey*, in 1834, by direction of His Highness the Pacha of *Egypt*: referred to in the Evidence of *A. Galloway*, Esq. 28 June 1837.

(*See Map.*)

The intention of the Pacha is to make railroads from Alexandria to the vicinity of Cairo as well as to Suez; and on that account, as well as from local circumstances, a branch road from the city of Cairo to the grand depôt was made. The road marked A, is the line to Alexandria; B, road to Cairo, and C, a small road merely for the trial of locomotive engines; the Suez road is marked D D D D, which runs in a right line for 75 miles, and branches round at Aggoroot Fort, and from thence to the Sea of Suez, in which it is intended to erect a pier for the facility of loading vessels. The entire length of the road is, from the grand depôt at Cairo to the Sea of Suez, 84 miles; the gradients upon the whole line are for the greater part very good, and no tunnels will be made. The general character of the ground is favourable for such works.

Alexander Galloway & Sons, Engineers.

Appendix, No. 3.

Answer to Question 1353.

Appendix, No. 3.

The following Answer to Question 1,353 is substituted for the Answer printed in the Evidence of *W. Morgan*, Esq. of 4 July 1837.

In reference to the Question 1353 I would wish to add the following particulars:—I recommended to the Provisional Committee of Merchants, on being consulted by them, vessels of 620 tons, builders' measurement, to have a displacement of 720 tons, and an immersed sectional area of 220 square feet when deep. I recommended these vessels to be fitted with engines of 51-inch cylinders, and 4 feet 6 inches stroke, in which lightness and compactness should be combined with solidity, similar to some of those which have been lately furnished to the French government, but with an increase of three inches to the diameter of the cylinder. From such vessels an average hourly speed of eight-and-a-half knots might be safely relied on, and, supposing them to be laden with 200 tons of coal, this quantity would enable them to accomplish a distance of 2,250 miles, or would suffice for a run of 11 days; for even with the ordinary condenser, their actual hourly consumption would not, with frequent pauses, exceed 15 cwt. These vessels would have accommodation for 60 passengers of all classes, and have stowage for about 20 tons of luggage and parcels, and as the quantity of coal alluded to would be excessive at all times, excepting during the height of the monsoon, a weight in goods equal to that excess might be conveyed, if freights should offer, between the monsoon periods. If, however, the system of condensation by surface, as practised by Mr. Hall, or that of condensing by surface and by reinjection of the condensed water, as practised by Mr. Howard, be adopted, the quantity of coals required to accomplish the greatest distance will be reduced very sensibly, and the capacity for cargo increased, without interference with the above average speed, or otherwise the average speed will be increased by the vessel being released from so much weight.

I cannot but regard it as of vital importance to adopt this system for the Indian steamers, not only from the foregoing reason, but because of the saving of which it will be productive in the wear and tear of the engines and boilers. This system has been long tried, and its extended and extending adoption by individuals, who each one in his own case has examined into the results which have followed on its use, will be better testimony in its favour than any opinion which I express; I may, however, be permitted to add, that one of the greatest obstacles to the accomplishment of long distances by steam will be in some measure removed by means of this improvement.

As vessels are now fitted, the capacity of their boilers, whether of iron or copper, to raise steam with any given quantity of fuel, decreases rapidly after the first few days firing; this is in consequence of the deposit which will take place, whatever care may be employed to prevent it. If a vessel with the common condenser be kept many days at sea, her hourly consumption, after the first few days, will rapidly increase, until at last it will be as great in attaining a low rate of velocity for her, as in those first days sufficed to procure her highest average; but, as by the new system, the boilers never become foul, the consumption of fuel will, at the close of a long voyage, bear the same proportion to the velocity obtained for the vessel as at first: larger vessels, and provided with greater power than those which I conceive to be sufficient to meet the present wants, would, no doubt, give a better performance, but not in the ratio of their first cost, nor in that of the expense of working them, and if there be no necessity for accommodation beyond 60 passengers, the very great difficulty that attends the manipulation of the larger engines when they require repairs, and the greater time required for these repairs, form an objection to the employment of them in the Indian Ocean.

Assuming it to be admitted that vessels of the class which I recommend offer sufficient accommodation, and that by attaining the average velocity which I assign to them, with the capacity for 11 days firing at full pressure, they are equal to the proposed duty, I submit the following table of comparison of the performance to be expected from them, with the ascertained performance of other sea-going vessels of admitted excellence; and by sea-going vessels, I mean those that cross the bay and the ocean, in contradistinction to the coasting steamers, whose averages form no exact criterion. I may here cursorily remark, that the smallest vessel named in the table, the Transit, has made her passages to and from Malaga, throughout the past year, and up to the present time, with the greatest regularity, and without having been surpassed by any of her competitors, either in respect of speed, behaviour as a sea-boat, or hourly consumption of fuel per horse-power; thus affording an inference that if the velocity of the new large boats has proved greater than that of the vessels which they were built to supersede, it may be in great part attributed to the improvements which ingenuity has been continually making in the forms of vessels, and in the performance of the machinery. The increased velocity ought not, therefore, to be altogether attributed to the increase of size and power. I may further add, that this little vessel being in the Tagus in the spring of 1836, weighed for England in company with a larger and more powerful boat; the larger vessel having been unable to cross the bar owing to the heavy sea running, the Transit also anchored, but afterwards weighed and stood for the bar, followed by her rival; the Transit made good her offing, and reached Falmouth on the very day on which her rival succeeded in quitting the Tagus, thus showing the capabilities of a well-proportioned steamer, even when of small tonnage and power.

In the case of the two French government vessels, the Leonidas and the Tancrede, I have seen official letters, stating them to have attained as high a velocity, for lengthened periods, as 10½ knots, even in bad weather; and a communication was made to me by the Chevalier Colonel Lampo, the chief of the état major of the Sardinian marine from Genoa, by which it appears that the Gulnare usually reached a velocity of 10 knots and 10½ knots per hour when the sea was not very rough. This vessel keeps up the communication between Sardinia and Genoa, and in her run from Blackwall to Genoa, touching at Falmouth, Lisbon and Gibraltar, she averaged a speed of nearly 10 knots by course, as I was informed by the late Chevalier Grosson, the chief of the Navy Board at Turin, who took his passage in the vessel: the weather was represented as having been variable.

COMPARISON of the Performance to be expected from the proposed Indian Steam Vessels, with the ascertained Performance of other Sea going Vessels of admitted excellence.

VESSELS' NAMES.	Builders' Measurement.	Nominal Power.	Tons Measurement, per Horse Power.	Tons of Displacement, per Horse Power.	Area of Immersed Section.		Average Velocity per Hour.	
	Tons.	Horses.					Knots.	
Medea, Admiralty steamer	840	220	3·818	5·59	1·61		8	
Gulnare, Sardinian Admiralty steamer.	320	90	3·55	3·78	1·84		9½	
Transit, Commercial Company	282	80	3·57	4·75	1·657		8	
Blazer, Admiralty steamer	533	120	4·358	5·175	2		7¾	
Leonidas and Tancrede, French Government	600	160	3·75	4·38	1·233	Bad Weather.	8·08	in the Bay, in the Ocean.
							8·936	in the Mediterranean.
Proposed Vessels, Indian steam	620	180	3·44	4	1·22			

N.B.—The average speed of the Medea and that of the Gulnare has been obtained from their performance in the Mediterranean; that of the Transit is principally from her performance in the Bay and in the Atlantic; the average of the Blazer is that of her performance in the Bay, in the Ocean and in the Mediterranean. The masting of the Medea and of the Blazer very sensibly affect their performance as steamers.

Appendix, No. 4.

Appendix, No. 4.

Communication from Major *Head.*

COMMUNICATION from Major *Head.*

STEAM communication between England and India to attain the objects of the mercantile and other interests involved in the undertaking should reach the three presidencies of Bombay, Madras and Calcutta.

Expense has hitherto prevented the advancement of this measure, although all parties consider that its adoption would be most beneficial to the interests of Great Britain and of India. It is advocated, therefore, that extended communication as above, should be considered in any plan for steam communication with India, as the enlarged receipts, in proportion to the increase of expense, and the extensive benefits of this arrangement would best ensure efficiency and permanency in the undertaking.

The duty to be performed by steamers, in connexion with this project, may be divided into three nearly equal parts, as follows: (There is also a distance of 220 miles or six days to cross Egypt.)

First portion of the communication, viz. between England and Alexandria,

From Falmouth to Gibraltar - - - - - - -	1,200 miles.
Gibraltar to Malta - - - - - - - -	1,050 —
Malta to Alexandria - - - - - - - -	850 —
Falmouth to Alexandria - - - - - - -	3,100 —

To cross Egypt from Alexandria to Suez.

The second portion includes,

Suez to Cosseir - - - - - - - -	270	1,070 miles.
Cosseir to Camaran - - - - - - -	800	
Camaran to Socotra - - - - - - - -		840 —
Socotra to Bombay - - - - - - - -		1,150 —
Suez to Bombay - - - - - - - - -		3,060 —

The third portion includes,

Socotra to Galle - - - - - - - - -		1,660 miles.
Galle to Madras - - - - - - -	650	1,450 —
Madras to Calcutta - - - - - - -	800	
Socotra to Calcutta - - - - - - -		3,110 —

The first portion of the work on the Europe side of Egypt requires 24 voyages of 3,100 miles each, making the distance to be run - - - - - - - - - -	74,000 miles annually.
The second portion includes, in 24 voyages - - - -	73,440 —
The third portion takes, for 24 voyages - - -	74,640 —

The route between England and Egypt, including stoppages, is now done monthly, on an average, in 19 days throughout the year, and would be less by proper arrangement. On the eastern side of Egypt the strength of the south-west monsoon is expected to check the regular progress of steamers for perhaps three months. The stations and depôts are not

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Communication from Major *Head*.

not established on the Europe side, but the voyages on the India side may be calculated as follows:

Suez to Cosseir, Jidda and Camaran	5 ½	days steaming.
Stoppages	2	—
Camaran to Mocha and Socotra	4 ½	—
At Socotra, to change vessels	1	—
Socotra to Bombay	7	—
Egypt to Bombay	20	—
Suez to Socotra, as above	12	days steaming.
Change vessel at Socotra	1	—
Socotra to Galle	8 ½	—
Change vessel at Galle	1	—
Galle to Madras	3 ½	—
Suez to Madras	26	—
Socotra to Madras, as above	26	—
Stoppage at Madras	– ½	—
Madras to Calcutta	4	—
Suez to Calcutta	30 ½	—

Including six days in Egypt; the time of transit would therefore be,

Between England and	Bombay	44	days.
—	Galle	46 or 47	–
—	Madras	51	–
—	Calcutta	55 or 56	–

It is considered the work between England and Egypt would be most effectually done by employing five steamers, each vessel having between 70 and 80 days steaming a year.

In the same way all the work on the Indian side would be performed by 10 steamers, each having from 70 to 80 days' work a year. This would not only be found to ensure certainty, by having sufficient vessels, but would give the necessary time for the overhauling of machinery, and would also afford the engineers and crews sufficient time for repairs, shifting of coal, and all other necessary work at the depôts, without incurring extra expense.

On the European side the vessels would sail as follows:

No. 1. Steamer.	January	From England to Gibraltar.
	February	At Gibraltar (rest), No. 5 proceeding onwards.
	March	To Malta and Alexandria.
	April	To Malta and Gibraltar.
	May	To England.
	June	From England to Gibraltar, &c., as before.

Nos. 2, 3, 4 and 5 would follow in succession, and give to each vessel a voyage of from six to ten days during four consecutive months, and the fifth month a rest at Gibraltar.

On the Indian side, the portion between Suez and Bombay would also be worked by five vessels, as follows:

No. 1. Steamer.	January	From Bombay to Socotra.
	February	At Socotra (rest), No. 5 going to Suez.
	March	To Suez.
	April	To Socotra.
	May	To Bombay.
	June	From Bombay to Socotra, &c., as before.

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Communication from Major *Head.*

Nos. 2, 3, 4 and 5 would successively follow No. 1, each vessel making four voyages of from seven to ten days in four months, and resting every fifth month.

To perform the monthly duty between Socotra and Calcutta, touching at Madras, five vessels would proceed thus:

No. 1. January - - From Calcutta to Galle.
February - - At Galle (rest), No. 5 going on.
March - - To Socotra.
April - - - To Galle.
May - - - To Calcutta.
June - - - From Calcutta to Socotra, as before, and the same each fifth month, having 2, 3, 4 and 5 to perform similar duties in succession, giving to each vessel from seven to ten days' voyage during four months, and a rest every fifth month. Should the Island of Socotra be found the most desirable station for the purpose, the vessels might make more regular work by always resting there, and by making voyages to Suez and Bombay on the one side, and to Galle and Calcutta on the other, with rest between each double voyage, and having all the vessels on the India side to reach Calcutta and every other station in succession, dividing the yearly work equally amongst the whole ten vessels. Another steamer would be kept in India available for extra duty, or to replace any of the above.

To effect a communication upon the above plan, would require an outlay of £. 500,000.

Annual disbursements - - - - - - - - - - - £. 185,000.

being an excess of about 49,000 *l.* above the sum required for communication to Bombay. This excess will be in all probability more than replaced by extra receipts, if the comprehensive plan be adopted, as may be seen by the following estimate:

	£.
Profit on passengers to Ceylon, Madras and Calcutta, from Suez (600) - -	28,500
Passengers at the intermediate places - - - - - - -	3,000
Deck and steerage passengers - - - - - - - - - -	2,000
Newspapers, periodicals, deeds, invoices, parcels, samples, &c., jewellery and bullion - - - - - - - - - - - - -	15,000
20,000 extra letters, Madras, Ceylon and Calcutta, 3 *s.* 6 *d.* - - -	3,500
Intermediate postages - - - - - - - - - - -	600
600 passengers on the Mediterranean side (profit) - - - - -	18,000
	£. 71,600

No attention is here given to communication eastward of Calcutta, which may be expected to contribute considerably to the above estimate of receipts, and to be established by branch steamers to Singapore, Canton, &c.

Steam communication with India being made more generally useful, becomes more economical, by being fed with fresh sources of profit. To make it permanent it ought to be formed on a plan to permit all India participating in the arrangements; otherwise large expenditure and limited returns will endanger the principle by encouraging opposition to it altogether.

Steam communication between England and the East, is of sufficient importance to command one unconnected plan throughout.

It will be seen to involve two-thirds of expense for one-third of the moral benefits it may produce, if confined to one presidency out of three, whilst two-thirds of the benefits for one-third the expense will be gained by extending it to all India. The receipts (except postage) would be in nearly the same proportion.

Appendix, No. 5.

Appendix, No. 5.

Major Sim's Report on the Paumbun Passage.

COPY of the SURVEY and REPORT on the *Paumbun Passage* between *Ceylon* and the Main Land of *India*, made in 1829, by Major *Sim* of the Madras Engineers.

EXTRACT, Fort St. George, Revenue Consultations, 15th April 1831.

REPORT on the Straits which separate the Ramnad Province, in the Peninsula of India, from the Island of Ceylon.

THE distance between Point Rameen or Tonnetory, in the Ramnad province, and the opposite coast of Ceylon, is about 62 miles. In the intervening space are situated the islands of Ramisseram and Manar, separated from each other by Adam's Bridge, and from the coasts of Ramnad and Ceylon, by the narrow channel or straits of Paumbun and Manar.

The Manar channel is about a mile in breadth, and separates the island of Manar from Ceylon. It is navigable for small dhonies only and country boats. . The island of Manar, which is a dependency of Ceylon, extends about 20 miles across the straits in a north-west direction. At its west end commences the bank called Adam's Bridge, which runs about 30 miles also in a north-west direction to the island of Ramisseram This island is about 10 miles in length, and is separated from the coast of Ramnad by the channel of Paumbun one mile and a quarter in width.

The Manar channel was surveyed under instructions from the Ceylon government, by the late Captain Dawson of the Royal Engineers, and Mr. Stewart, the master attendant of Columbo, who described it as a long, narrow and very winding channel, having about six feet of water in the shallowest parts, with the exception of a bar opposite to its south end, on which there is not more than three or four feet of water. This channel, from the account given of it by the officers who surveyed it, does not appear to be capable of any material improvement.

The sand bank, called Adam's Bridge, is a very extraordinary formation. It is only about a quarter of a mile in breadth, and consists entirely of sand, partly above and partly below water, collected apparently by the surf and currents, and unsupported, as far as could be ascertained, by rock. The east end of it was pierced by the Ceylon officers to the depth of 30 feet, and nothing found but sand; on each side of the bank, at the distance of two and a half or three miles, the sea is six fathoms deep, and quite free from obstructions of every kind.

There are three principal openings or channels across the bank, one near the island of Manar, called the Tal Manar passage; the second eight miles further to the west, and the third about 11 miles from the island of Ramisseram, termed the Tannycoody passage. This last was examined and surveyed on the present occasion. It is narrow in the centre and 30 feet deep, with broad curved bars opposite to its two ends, on which there is not more than five or six feet of water. The bank between it and Ramisseram is entire, and several feet above water. The Tal Manar passage was examined by the Ceylon officers, and resembles exactly that of Tannycoody, but it is not so deep, there being only about three feet of water on its north bar.

The intermediate opening was not examined, but from its appearance, as well as from the description given of it by the fishermen who frequent the place, there can be no doubt of its corresponding very nearly with the other two. It is said to be rather deeper than the Tal Manar passage, but not so deep as that of Tanaycoody.

In the vicinity of the Tal Manar and Tannycoody openings, the bank is visible above water for several miles, intersected by only a few narrow openings, but towards its centre it is chiefly covered with water, and very little sand is to be seen, though, from the surf breaking exactly on the line of the bank, the depth of water cannot exceed two or three feet.

During both monsoons, on the lee side of the bank, to the distance of from half a mile to a mile, there are great numbers of irregular shifting sand banks scattered about, on which there is from two to four feet of water, with passages between them eight or nine feet deep. The weather side, on the contrary, particularly towards the end of the monsoon, is in a great measure clear of such banks, and the surf breaks on its shore nearly in a straight continued line. When the monsoon changes, the strength and prevailing direction of the current change too, and the loose sand of which the shifting banks are composed, on what was the lee side, being stirred up by the surf and sea, is swept by the current through the channels and deposited on the opposite side, partly on the bars and partly in loose detached heaps along the bank. These deposits appear to be further increased by the sand thrown upon the weather shore by the surf, which as soon as it becomes dry, is carried by the wind

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Major Sim's Report on the Paumbun Passage.

across the bank into the sea on the other side. It was observed, when the wind was tolerably strong, that a continued stream of sand was swept across the bank into the sea on the lee side. The beach of Adam's Bridge, therefore, to the distance of about a mile on both sides, is continually changing and shifting: on the weather side it is generally clear, except immediately opposite to the channels where there are always projecting bars, while on the opposite side there are many loose banks scattered about and constantly changing, and varying in position and extent as the monsoon advances, and according to the state of the sea and weather.

During both monsoons rather a high surf breaks on the weather side of the bank, but the south-west monsoon produces much the highest surf, accompanied by a long heavy swell. During part of the north-east monsoon the surf breaks on both sides of the bank.

Dhonies in ballast and fishing boats occasionally pass through the openings in fine weather, but the passage is attended with some difficulty and danger, and is not common.

There is an account, I was informed, given in the record of the Dutch government of Ceylon, of a Dutch fleet having on one occasion escaped from a Danish fleet by passing through the channels of Adam's Bridge: if this be authentic, either some of the channels must have been deeper in former days or the ships must have been of a small size. It is probable indeed that the depth and extent of openings are constantly changing, from the effect of a current and surf, and the quantity of loose sand floating about the bank, and that they will not be found of the same size for any length of time; they appear to be affected by every change in the weather, the currents and surf, and most likely vary considerably in depth in different seasons.

If it be possible to obtain any where through the straits a channel sufficiently deep for all classes of ships, it must, I think, be sought for in some part of this bank, and even here the practicability of opening such a channel, and of keeping it open, is very doubtful. A strong double bulwark of stones across the bank, extending into deep water on both sides, with a narrow opening of 100 or 200 feet, might I think with reason be expected to accomplish the object. The velocity of the current would probably keep a narrow fixed channel of that description always sufficiently deep, and sweep off any sand that might be carried into it either by the sea or by the wind, and as the bulwark would extend into deep water beyond the shifting sands and the influence of the surf, there would be little risk I think of its ends being filled or choked with sand. The danger to be chiefly apprehended is the formation of bars opposite to the ends of the channel, similar to what are now found in front of the natural openings, particularly on the south side, where from the superior strength of the south-west monsoon and heavy swell, sand banks are always the largest and most numerous; but of this, I think, there would not be much danger, the quantity of sand carried through the channel, from its being beyond the influence of the surf, would probably not be very great; and as the current would be rapid and extend into deep water, it is likely that what did pass through it would be dissipated and disappear.

The cost of such a work would, however, be very great indeed, and could only be justified by its being considered an object of high national importance to have a passage sufficiently deep in time of war for the largest vessels. In the event of a struggle for the superiority at sea with an European enemy, the advantages of such a channel would be invaluable; but it is doubtful whether the benefits which commerce would derive from it, great as they undoubtedly would be, would warrant an undertaking, the expense of which, under the most favourable circumstances, must be very large, and the success, from a variety of causes which neither can be foreseen nor guarded against, uncertain.

There remains to be considered the Paumbun channel, or strait between Ramisseram and the Ramnad coast, which affords, perhaps, the only prospect of a moderately deep channel such as would benefit commerce generally, and the coasting trade of India in particular, without the necessity of incurring a very large or disproportionate expenditure.

The examination of the Paumbun passage has accordingly, and in conformity with the instructions of Government, occupied the whole of the attention and time of the officers deputed for the purpose of surveying the straits, with the exception of a few days devoted to the inspection of Adam's Bridge.

The obstacles to be overcome at Paumbun are a dam or ledge of rock, extending from the island of Ramisseram to Point Ramen or Tonnetory, on the opposite coast of Ramnad, and an irregular sand bank a little to the south of it, the exact situation and shape of which will readily be understood from an inspection of the accompanying maps, on which the dam and sand bank, with the soundings in their vicinity, are minutely and accurately expressed.

The dam is 2,250 yards in length, and runs east and west; it is bounded by two parallel ridges of rock about 140 yards apart, the north ridge is considerably the highest, and is termed the first or great dam; it is in most places visible at low water, though nowhere sufficiently connected to prevent entirely at any time the passage of the water. The line of the south ridge or dam can also be distinctly traced at low water, but only a few detached rocks on it even then appear above water; the whole or greater part of the space between these two ridges is filled up by large irregular masses of rock in various positions, but generally in directions nearly parallel to the principal ridges, and usually several feet lower than them.

The continuation of the rock or dam can be readily traced on the main land and island of Ramisseram, in its natural position, and in uniform layers, having a small inclination to the

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Major Sim's Report on the Paumbun Passage.

the south, preserving exactly the same direction, but on both sides several feet higher than the dam.

The ridges which form the dam are very much broken and displaced, and now consist of large flat masses of rock, seldom more than two or three feet in thickness. Their shattered state, and the break or chasm which they form in the general height of the stratum of the rock, clearly indicate that the island of Ramisseram was at one time connected with the main land, and that it has been separated in the first instance by the sea, during storms, breaking over and bursting the chain of rocks which joined them, and afterwards by the water undermining and displacing the broken fragments.

This supposition is confirmed by the records of the Pagoda of Ramisseram, which relate that until the early part of the 15th century, the island was connected with the continent by a narrow neck of land, and that the swamy of Ramisseram was carried across to the main land thrice every year on particular festivals. During the reign of Achoodapah Naig, Rajah of Madura, about A. D. 1480, a small breach was made in the land which formed the junction, by a violent storm, but as there was no great depth of water in it, travellers continued to cross on foot till the time of his successor Vessoovanada Naig, when the breach was much enlarged by a second storm; the opening was filled up and repaired, to facilitate the passage of the pilgrims to the Pagoda of Ramisseram, and the repairs lasted about 10 years, when a third hurricane destroyed them and greatly extended the breach, after which no attempt was made to fill up the chasm.

Since then, every succeeding storm has assisted in destroying and undermining the dam, and the inhabitants believe that its destruction is still proceeding, and that 15 or 20 years will make a sensible alteration in it; they state that a storm occurs generally once in that period, and always displaces and washes away a portion of the rock.

Besides the ridges of rock which constitute the dam, and which as already stated are about 140 yards in breadth, rocks and stones mixed with sand form the bottom to a distance of about 800 yards on the north side of the dam, and 200 yards on the south side. Beyond 800 yards, the bottom to the north consists of mud and clay, with 14 feet of water, and on the south side beyond the rocks it is soft mud and sand.

From a careful examination of the ground on the north side of the dam, by means of iron probes, and from the appearance of the beach on the Ramisseram and Ramnad coasts, it is probable that no connected layers or beds of rock extend further than 150 or 200 yards from the dam, and that beyond that distance the bottom consists of detached fragments of rock and stones mixed with hard gravel and sand; the bottom on the south side is similar, being composed partly of beds of rock and partly of loose fragments.

The ledges of rock which form the dam, and the strata on both sides, have been pierced and blasted in a great many places, and considerable quantities of the rock removed for the purpose of ascertaining its quality and depth, and the nature of the ground beneath. The rock of the dam is considerably harder as well as thicker than what is found on either side, but the whole is soft and easily pierced and broken. It appears to be a sand stone of a soft description, and generally in an advanced stage of decay, varying in thickness from one and a half to four feet, and resting on a bed of rough gravel; it is hardest at the surface, and becomes softer and coarser towards the bottom, which had indeed more the appearance of indurated gravel than of rock. The rock to the north and south of the dam seldom exceeds one and a half or two feet in thickness, and is in a very decayed state.

The several strata are found in their natural position on the island of Ramisseram, and on the opposite coast, and a number of wells having been sunk through them by the inhabitants, the quality and thickness of the rock are easily examined there, and correspond exactly with the preceding description.

In the dam there are two channels, one about 500 yards from the eastern end, which is termed the large channel or river, and through which alone vessels at present pass. The small channel is 300 yards from the west end of the dam; it has only three feet of water in it, is very narrow and full of rocks, and is in consequence only used by canoes and boats.

The principal passage is about 50 yards broad, and is of very irregular depth, with a rocky bottom; in some places it is not more than two and a half feet deep at low water, but there is a very winding narrow channel through it, just sufficiently broad for the passage of a dhoney, which is nowhere less than five and a half feet deep at high water, ordinary tides. This channel, from its very winding course and little depth of water, is exceedingly inconvenient, and occasions great delay and considerable expense to all vessels passing through it; there is often a rapid current and heavy swell, and, unless in very moderate weather, no vessel drawing more than four or four and a half feet of water ventures through it, and in rough or stormy weather it is often for several days altogether impassable.

The passage has always been confined to dhonies and other small vessels, chiefly belonging to native merchants. These, when coming from the northward, anchor at 1,100 or 1,200 yards from the east end of the dam, in 16 feet of water and soft mud; there they unship cargo till their draught of water is reduced to four or five feet, according to the state of the weather, and then drop or warp through the channel as the wind or current are favourable or otherwise. After passing the channel, they anchor a second time about 400 yards below the dam in 12 feet water, and reship cargo till they draw about six feet. They then proceed to the southward and cross the sand bank already referred to, about 2,700 yards below the dam, and on which there is not more than seven feet of water when the tide is full. As soon as they cross the bank, they anchor for the third time to reship the remainder of their cargo, and then continue their voyage.

These operations usually occupy three or four days, even under the most favourable circumstances;

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cumstances; and when the weather is stormy, the detention is considerably greater, for the pilots will not then undertake to carry any vessel through the passage; and if this happens during the north-west monsoon, the vessels are obliged to remain anchor to the north of the dam, in an open situation exposed to the risk of being driven on the rocks to the leeward. Moreover, when 10 or 12 dhonies arrive together, which often is the case, the last are occasionally detained for a very considerable period: for, as they can only pass when the weather is moderate, and then only three or four during one tide, owing to the crookedness of the channel, it may happen that the whole number are unable to get through while the wind and sea continue moderate, and then the last arrivals are obliged to wait 10 or 12 days longer for another interval of fine weather.

The expense attending the passage of the channel, and the bank below it, varies from 10 to 40 rupees, according to the size of the vessel; and when the detention and risk of damage are taken into the account, the whole must form a very heavy burden on the coasting trade of the country, and greatly retard its extension and improvement.

The removal, therefore, of the existing difficulties and obstructions, and the improvement of the channel, so as to facilitate the passage of the vessels which now use it, and at the same time to admit of its being navigated by ships of a large size and superior description, is an undertaking of much importance and highly deserving of attention.

From the preceding remarks, and from an inspection of the chart, it will be seen that the removal of the rock which obstructs the channel, though that alone would be an improvement of much value, would not remove the whole of the difficulties at present experienced in navigating the Paumben channel, for after passing through the rocks, there still remains a sand bank to be crossed, on which there is not more than seven feet of water, at high water ordinary tides.

The removal of this bank, it is to be feared, may prove a very difficult part of the undertaking; at all events, the success of any measures adopted for the purpose, is much more uncertain than if rocks formed the obstruction, for where that is met with, its removal can always be calculated on with certainty, though the expense may, in some cases, be great.

The bank, it is probable, consists chiefly of the earth and sand which composed the narrow neck of land that formerly connected the main land and island of Ramisseram, and of the sand washed out of the deep channels beneath and to the south of the dam, by the rapid currents over it, and through its openings. On the breaking up of the stratum of rock, which formed the junction, the loose sand on which the rock rested, and by which it was protected, would, on being uncovered, be swept away by storms and by the rapid currents flowing through the openings and interstices among the broken fragments. These currents, after passing the rocky barrier and reaching the open space to its south, spread and lose their velocity; and, being at the same time met by opposing currents from the east and south-west, the sand washed from among the rocks would be deposited in the place now occupied by the bank, where the water is comparatively still and smooth, being protected to the north by the dam, and on the south side by a chain of small islands.

The stream through the principal opening is extremely rapid at times, and as soon as it escapes from the rocks and reaches the soft sandy ground, has, it will be seen, scooped out for itself a deep and extensive channel to the distance of upwards of a mile and a half. The sand from this channel being thrown up and deposited at its sides, and also to the southward, where the stream, by spreading and meeting with opposite currents, looses its rapidity, has no doubt contributed to the formation of the bank. It does not appear that the bank is now subject to any material alterations or changes; the pilots state that the depth of water has not altered within their memory, as far as they can judge, and the irregularity of the soundings, which often vary from one and a half to two feet in a very short distance, together with the quality of the bottom, show that the sand is not frequently shifting as at Adam's Bridge; nor does there seem to be any reason for considerable changes. The bottom of the sea to the north is either rock or clay, and the currents from that direction appear to bring very little sand with them, for the water during the north-east monsoon, is usually clear and free from mud or sand; storms may produce material changes, and probably do, but whether these are permanent or not, there are no means at present of ascertaining.

A careful and attentive examination of the whole of the channels between Paumbun and Point Ramen, suggested the three following plans for its improvement:—

1. The present principal opening through the dam may be cleared of the rocks which obstruct it, and straightened without increasing its depth.

2. The same opening may be deepened to eight and a half or nine feet at high water, or during tides, or another channel may be opened of the same depth in some other part of the dam, if considered more expedient; and—

3. A channel, 12 or 14 feet deep, at high water, may be formed either through the dam, or through the projecting point of land on the Ramnad coast, at the distance of about two miles west of Point Ramen.

From the description that has already been given of the channel, through which dhonies now pass, it will be evident that much difficulty and delay must have arisen from the crooked and winding shape of the channel. There were several turns in it, and one in particular, where the current is the strongest, which increased the difficulty very much; and frequently, when the weather was rough, interrupted the passage entirely for several days at a time. It would be satisfactory to Government to know that these obstructions have been all removed by the small working party, which was authorized to be employed for the

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purpose of assisting in the examination and survey of the passage, and the channel rendered quite straight, and also a little deeper than it was formerly. Dhonies now pass through it quickly, using only one warp, instead of three or four, as they were obliged to do before the rocks were removed, and one or two keeled vessels, drawing about six feet of water, have sailed through. This alone is a very considerable improvement, for it will prevent much of the detention to the north of the dam, which has hitherto been unavoidable, and which was always attended with danger, and will at the same time admit of vessels passing through, drawing a little more water than formerly, by enabling them to pass quickly when the tide is quite full. The party continues at work in the channel, and may be expected still further to improve it before the work is stopped by the monsoon.

The second plan, namely, opening a channel eight or eight and a half feet deep through the rocks, may be accomplished I think with most ease, and least expence, at about 1,300 feet from the west end of the dam, where it will be observed from the chart there is seven and a half and eight feet of water, near the main dam on the north side, and within 100 yards of it on the south side; the quantity of rock, therefore, to be removed, to obtain a channel of that depth, would not be very great, while on its removal much comparative facility would be experienced, in consequence of there being very little current or swell to interrupt or retard the work; for the main dam at that place is tolerably compact and entire, and there is consequently very little current in its vicinity. By allowing a part of the main dam to remain till the last, to obstruct the current and swell, and by completing the channel on both sides before its removal, the greater portion of the work would be performed in comparatively smooth water, which is of very great consequence in blasting and weighing rock. The narrow part of the channel would also then be very short, not exceeding 150 or 200 yards in length, which would be a great advantage to vessels.

The objections to it are, that the anchorage and channel would be more exposed to the strength of the wind and swell during the north-east monsoon than the present channel, which is sheltered in some degree by the west end of Ramisseram; and being farther removed from the eastern shore, the pilots would have more difficulty in communicating with vessels and affording them assistance in stormy weather.

On the south side of the dam there is a projecting point of the sand bank, between the proposed place and the deep channel opposite to the principal opening, on which there is not more than from five and a half to six feet of water at low tide; if this were to remain in its present state, vessels, after getting through the channel during the north-east monsoon, would be obliged to pass round the head of it in a direction across the current which would evidently be attended with considerable difficulty to dhonies and country craft. But, as this point of the bank is nearly in the direction which the stream through the new channel would take, it would, I have not the slightest doubt, be entirely swept away on the opening of the channel, for it seems to owe its existence to the absence of any strong current or stream in that part, in consequence of the compact quality of the dam there. The only real objections which I can perceive is its greater distance from the shore, and, consequently, greater exposure to the wind and swell during the north-east monsoon.

To deepen the present channel to the same extent would be a much more tedious and difficult undertaking. There, it will be seen, the shallow water extends to a much greater distance to the northward, for at 600 yards from the dam the depth is only six and a half feet at low water. To obtain a channel of the desired depth it will be necessary, therefore, to excavate and deepen not less than 700 or 800 yards in length, while, at the former place, the distance does not exceed 200 or 250 yards. The difficulty of the operation also would be increased, in a very great degree, by the distance from the dam, the heavy swell which often prevails, and the rapidity of the currents, [illegible] would retard the progress of the work very greatly, and raise the expense proportionally; for when there is a heavy swell or rapid current, it is impossible either to blast or weigh the rock.

A large proportion of the space to be deepened, it is true, does not appear to consist of solid rock, but of fragments of rock and stones, firmly fixed in sand or gravel, and covered with weeds. It is probable, from the appearance of the adjoining beach and land, as has been already observed, that no large masses of rock would be found at a greater distance than 150 or 200 yards to the north of the dam, and that beyond that line the bottom consists of small pieces and fragments of rock, carried there originally by the current, and now firmly fixed in hard gravel and sand. These generally it would not be necessary to blast, as it is presumed they are not too large to be weighed entire; but still much difficulty and inconvenience would be experienced in loosening and removing them, in an exposed situation with a heavy swell, and in five or six feet of water. The bottom appears to be too compact and rough to be cleared and deepened by dredging, or by any similar means procurable in this country. A diving bell, sufficiently large to admit of two or three men working within it, with short iron crows and pickaxes, might be employed with great advantage, and would be highly useful. Divers, of whom there are great numbers in the vicinity, might also be used to assist in loosening the fragments with the same instruments, and afterwards in raising them into boats or catamarans, either with the hand or with windlasses, as circumstances might require. An operation of this kind, subject too, as it would be, to frequent interruptions from rough weather, it is evident must be very tedious and expensive, and could not be completed probably in less than two or three years. But of its success I think there is no reason to entertain any doubt, and it certainly would be a vast improvement. [illegible]

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convenient and useful than a channel of the same depth at any other place, and there would be this advantage attending the plan, that to whatever extent the improvement might be prosecuted, whether continued to its full accomplishment, or stopped at any intermediate stage, no part of the work, if judiciously conducted, would be thrown away or prove useless, but all that might be performed would in some respect or other be beneficial.

The only objection is the expense, which would be at least three times as great as the cost of a similar channel at the place already mentioned.

The advantages to be derived from an eight-and-a-half or nine feet channel through any part of the dam would be very important. Many of the small dhonies would be able to pass through at once without any detention, and the inconveniences and delay now experienced by the larger vessels would be very greatly reduced. They would have to unship a comparatively small portion of their cargo, and, when sufficiently lightened, would be able to pass through in almost any weather, and reach a perfectly safe anchorage, instead of being delivered in a very exposed and dangerous situation.

What effect the improvement of the present channel, to the extent here contemplated, or the opening of a new one, might have on the sand bank to the south of the dam, it is impossible to foretell; but that a considerable change would be produced, appears to be very probable; and if the increased stream and currents were taken advantage of, and judiciously directed, it is not unlikely that the passage across the bank might be considerably deepened. But this forms no necessary part of the plan now under consideration, though, in the event of its being adopted, this branch of the subject ought to be carefully attended to; for, without a very material change in the sand bank, the navigation of the straits, if the channel is made through any part of the dam, must remain very imperfect, and be confined chiefly, as it now is, to country vessels.

The third plan is to open a channel 12 or 14 feet deep, either through the Paumbun dam, or, if it should be thought more advisable, through the promontory on the Ramnad coast. To form a channel of that depth through the dam would be a very expensive and exceedingly laborious undertaking. The length of the cut would be upwards of 1,200 yards, with an average depth of four feet to be excavated. The labour of blasting and weighing rock, when the depth of water exceeds eight feet, is very great indeed, and almost impracticable, except in very smooth water. At the distance of 800 yards from the dam, the swell, during a great part of the year, is very considerable, and would add very greatly to the expense and labour of the work; for it could only proceed there during very moderate weather, and would be liable to constant and tedious interruptions.

Of the whole extent, perhaps not more than half would be found to consist of rock requiring to be blasted, and the remainder of fragments of various sizes, mixed with gravel or sand, a considerable portion of which, it might be expected, would be swept away by the currents on the removal of the rocky ledges or beds which now protect them. Still the labour would be very great and extremely tedious, and the undertaking would require several years, probably not less than five or six, for its accomplishment.

But even if the channel were completed to the proposed extent, I think it very doubtful whether the northern part of it would not be liable to fill up again; for on the north side, at the distance of 800 or 900 yards from the dam, the current is not, I think, sufficiently strong to keep such a channel clear, and the influence of the stream through the enlarged opening of the dam would scarcely extend to so great a distance.

The plan would also be incomplete without the removal of part of the sand bank to the south of the dam, or a considerable improvement at least in the passage across it. This, it has already been stated, is uncertain under any circumstances; though I think the increased quantity of water and force of the stream, which so extensive an enlargement in the opening through the rock would produce, would contribute very materially to the success of any measures that might be undertaken with that view.

Though at first sight the bank appears to resemble very much the bars which are formed opposite to the channels through Adam's Bridge, still I think it is essentially different from them. As far as can be judged, it is permanent and not liable to shift, and the principal causes which formed it have, it seems probable, from the reasons assigned in a preceding part of this report, long ago ceased to exist, or at least now act in a very inferior degree. The bars opposite to the channels through Adam's Bridge are most extensive on the south side, and are thrown up by the very high surf and heavy swell produced by the south-west monsoon, which acts with great force on the south side of the bank. But at Paumbun, the space immediately to the south of the dam, where the bank is situated, is protected from the violence of the south-west monsoon by the range of islands to the south of it, which form a complete barrier, and comparatively little swell or surf are ever experienced there, any alterations produced in the bank would in consequence be the more likely to prove permanent, and I think that the current and stream might be so directed, by means of stone bulwarks or jetties, as to produce a very great improvement.

But this plan, on the whole, appears to me much too laborious and expensive, and at the same time attended in several respects with too much uncertainty to be advisable, and if a 12 or 14 feet channel be considered absolutely necessary, I would recommend, in preference, that it be opened through the promontory of the main land.

In 1814, there was a very severe storm or hurricane at Ramisseram, during which the sea broke over the land in many places, and at about two miles from Point Ramen cut a channel completely across it. A ledge of rock on the south side of the land was destroyed and swept away, and a pit excavated seven or eight feet below the level of the sea, for

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a distance of 200 yards, from the end of which to the north shore the bed of the channel is three or four feet above the level of the sea. The gale from the northward lasted only about four hours; had it continued a few hours longer from that direction, it is probable that there would have been a deep channel formed entirely through the land, though most likely it would not have continued open for any length of time; for the surf which breaks on both shores, but particularly on the south side, with considerable force, not being counteracted by a sufficient rise and fall in the tide, would probably in a short time have filled its ends with sand.

The breadth of the land here is 728 yards; it consists chiefly of loose sand, with a little soft decayed rock mixed with it on some parts, which is easily broken with the hammer and pickaxe. On the north side there is a reef of coral, not solid or connected, but in detached masses, and of no great breadth, for at 400 yards from the shore the water is 14 feet deep. On the south side the water deepens very rapidly, the depth at 100 yards from the shore being two-and-a-half fathoms. A channel, 12 or 14 feet deep, might therefore be cut here with comparatively little difficulty, and at a moderate expense, and being to the south end entirely clear of the bank beneath the Paumbun dam; the removal of that bank, or a passage across it, would form no part of the undertaking. It is probable, however, that the channel would not remain open without some contrivance at its ends to prevent the surf from filling them up with sand; and this would, it is apprehended, be the most expensive and uncertain part of the project.

The easiest and most likely way to effect the object would, I think, be to carry a double bulwark of large stones from both shores, in a continuation nearly with the sides of the channel, into deep water, beyond the influence of the surf. The ends of the channel thus terminating in deep water, it does not appear that any cause would exist there to fill them with sand, for they would be beyond the reach of the surf, and there are no currents likely to produce that effect. It is probable that very little sand would enter the channel, and that whatever did enter would be swept away by the current through it, which at all seasons of the year would be considerable. The principal danger to be apprehended is the formation of a sand bank to the south of the channel, or bars opposite to its ends, as occur before the natural openings in Adam's Bridge. This apprehension is perhaps not entirely without grounds; but if, on the completion of the channel, any symptoms of either a bank or bar should appear, I think the formation might be entirely prevented by constructing a second bulwark of stones in front, and perpendicular to the ends of the first bulwark, at 100 or 200 feet from them. This narrow opening between the two bulwarks would be swept by the south-west monsoon and current produced by it, which would most likely keep it always deep and free from sand. On the north side there is much less danger of any banks forming, for there are none opposite to the Paumbun channel, and the sea beyond the rocky ground is clear and free from obstructions of every kind.

After fully weighing all the advantages and risks attending the opening of a channel 12 or 14 feet deep at this place, I think there are good grounds for considering the undertaking to be practicable; but, in deciding on the expediency of adopting or rejecting it, it is necessary to take into consideration the possibility of a partial or complete failure, for the project is so entirely new, and so unlike anything that has hitherto been undertaken in India, that no comparison can be made with the result of other works of the same kind, and no information therefore drawn from experience; while, at the same time, the nature of the currents, their strength and direction at different seasons of the year, and the manner in which they are affected by the opposite monsoons, are all in a great degree still to be learnt.

Respecting the expense of the different projects, from what has already been said, it will be evident that much uncertainty must necessarily exist and that it is impossible to form anything like even an approximation to a correct estimate. The expense will depend greatly on the seasons being favourable or otherwise, the exact quality and nature of the ground beneath the surface at the place where the channel may be opened on the currents, and the effects they may have in accelerating the operations, by sweeping away the sand and loose soil when the solid rock is removed, or retarding it, by producing in some cases a contrary effect, and on a thousand other circumstances which it is impossible to foresee, and which can only be discovered as the work advances. In the present state of our information a general plan or course of proceeding only can be laid down which will be liable to constant changes and modifications, and whichever of the projects that have been suggested may be preferred, it will be necessary to leave a great deal to the discretion and judgment of the officer who may be entrusted with its execution, not only as to the manner of proceeding with the work, but also the means to be used, the expense to be incurred, and the extent to which the undertaking may be carried with advantage. The following sums must, therefore, be considered as very rough guesses only, which may exceed or fall short of the actual cost to a very considerable extent.

The plan of opening a channel eight or nine feet deep and 50 feet wide through the dam, at about 1,300 feet from its west end, may be calculated at 70,000 rupees, and two seasons would probably be required for its completion.

Deepening the present channel to the same extent cannot be estimated at less than 150,000 rupees, and probably three years would be required to complete it.

The practicability of opening a channel 12 or 14 feet deep through the dam, and of keeping it open, appears to me so uncertain with our present knowledge, that it cannot with propriety be recommended, and it is unnecessary, therefore, to consider its expense.

Cutting a channel through the main land, where the sea made a breach in 1814, would cost

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cost probably from one and a half to three or four lacs of rupees, according to the nature and extent of the works that might be required at its ends to prevent them from filling up with sand, and an equal uncertainty of course exists with respect to the time required for the performance of that project.

From a review of the several plans that have been proposed, it will appear, I think, that if a channel of eight or nine feet through the rocks be required, without reference to the removal of the sand bank to the south, or the improvement of the passage across it, the most advisable place for such a channel is at about 1,300 feet from the west end of the dam.

If it should be considered expedient to confine the operations in the first instance to an eight or nine feet channel, but to keep in view the option of extending the depth afterwards to 10 or 12 feet, if circumstances and experience should justify the measure, it is probable that deepening the present channel would be the most desirable and safe way of prosecuting the undertaking. Though much more expensive, it is the more certain, and the channel would be in the most convenient situation.

The removal of the rocks which obstructed this channel have altered it considerably since it was inspected in last March, and in some places the layer or crust of rock which covered its bottom has been entirely removed. It is extremely desirable that the effect of a north-east monsoon should be seen on the channel on its altered state before any final conclusion is come to respecting its comparative merits and defects with those of the proposed new channel near the west end of the dam. If there is only a covering or crust of rock, as there seems every reason to believe, the rapid current through the channel during the north-east monsoon may, as that is removed in several places, produce considerable alterations, not only on the channel itself, but on the ground to the north and south of it; and this it is highly desirable to ascertain before the expediency of improving or abandoning the channel is decided.

If a channel of 12 or 14 feet is considered an object of sufficient importance to warrant the attempt under the uncertainty which now exists with respect both to success and expense, and the imperfect state of our knowledge on the subject, I think the plan of opening a channel across the main land where the sea broke over in 1814 ought to be adopted.

The best seasons for working, whatever plan is preferred, as far as can be judged from the experience of the present year, are from the beginning of March to the middle of May, and from the end of August to the commencement of the north-east monsoon. There are occasional intervals of fine weather in the months of February and August, which might also be taken advantage of; but more than four or five months in the year cannot be calculated on for carrying on that work with advantage. The sea appears to be smoothest and least affected by currents from the beginning of September to the middle of October, and during that period the improvements to the north of the dam or promontory ought to be executed, for in the north-east monsoon the water there is generally too rough to admit of the work being prosecuted with much success. In the months of March, April and May, the rock to the south of the main dam might be removed.

The process of boring and blasting rock under water was readily learnt by the small party of pioneers employed on the survey, and, after a little practice, was conducted with much success. In blasting the rock, previously to removal, jumpers six inches in diameter were generally used and found most efficient. They were worked by three men at a time, on a low raft formed of two large canoes lashed together and covered with loose planks. After a great number of experiments with different quantities of gunpowder, charges of from four to six lbs. were thought to produce most effect, and usually employed. The rock was bored quite through, the object being to separate and displace the fragments completely, and the charge covered with gravel and small pieces of rock and coral. The gunpowder was fired in the usual manner by means of tin tubes; the large fragments were weighed by means of a common country boat, furnished with a windlass; derrick and tackle slings, made of strong rope, were placed round the fragments by divers, to which the tackle was made fast, and in this way pieces of rock three tons in weight were occasionally raised into the boat. The apparatus was very imperfect; the flat boat and the small supply of timber sent from Madras for this part of the operation having been lost on the way down to Ramisseram, and the only substitutes procurable on the spot were a clumsy country boat and some drift timber. The small pieces of rock were brought up with the hand by divers.

The most convenient and expeditious apparatus for weighing and removing the fragments of rock in future would perhaps be a large flat boat, partly decked, furnished with a double set of derricks, windlasses and tackles, so arranged as to be used at the same time on opposite sides or ends of the boats. To save the necessity of raising the fragments into the boat, which was found very difficult and attended with much delay, there ought to be three or four double canoes, with decks, to receive the rock, and convey it to the places where it is to be deposited. There would then be no necessity for changing the situation of the weighing-boat when once placed till all the broken rock within its reach was removed, which is a point of much importance, for it was found a very troublesome and dilatory operation to fix the boat in the right spot when there was much current.

The canoes of the boring rafts ought to be decked to prevent them from filling with water and sinking, which they are very apt to do when there is any considerable swell.

A diving bell, which might be made at Madras, would be of great use for examining

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the bottom and fixing the most convenient places for blasting. The divers, it was soon found, could not be safely entrusted with this; they usually directed the jumper to the first rock they happened to meet with, and frequently caused the same rock to be bored several times, which occasioned the loss of much time and labour, and left the rock imperfectly broken, and in a very unfit state for further blasting. Much depends on the selection of the points for boring and blasting, and a diving-bell would enable the officer in charge of the work to regulate this part of the operation himself.

When the water was tolerably smooth, and the current not strong, very little difficulty was experienced in blasting and weighing rock at the depth even of eight feet; but when there was any considerable swell, or a rapid current, it was impossible to proceed with the work: hence the great advantage, in respect both to time and expense, in selecting such a situation for the channel as will afford smooth water for the longest periods.

In conclusion I beg to observe, that it would afford me much satisfaction if Government, previously to adopting any of the preceding plans, or coming to any final resolution on the subject, would be pleased to forward to the honourable the Court of Directors, for the purpose of being submitted to experienced civil engineers in England, copies of the charts of the straits, and of all the information which has been collected during the late survey. The improvement of the navigation through the Manar straits, is an object of so great value and importance to Indian commerce, and so much depends on the choice of place and on the means to be used, that every precaution ought to be taken to obtain the best possible information and advice on the subject, and a delay of a year or two is of little consequence when compared with the advantages which might possibly be derived from the opinion and advice of engineers in Europe, who have been employed on similar undertakings.

If this suggestion should meet with the approval of the right honourable the Governor in Council, I would further beg to propose that the papers should be intrusted to the care of Capt. A. F. Cotton, who it is likely will be obliged to proceed to England in January for the benefit of his health, and who having been employed at Paumbun during the whole of the survey, and having had the immediate charge and direction of the experiments, will be able to afford information on many points which cannot be sufficiently explained either by charts or reports.

Pending the reference to England, I would recommend that the observations on the passage should be continued, and that the present party of pioneers, increased to 50 men, with some ship Lascars and divers, should be employed under the direction of an engineer officer in the improvement of the present opening, and in making some experiments on the bank to the south of it. Whatever the final decision may be respecting the more extensive improvements, the labour of such a party cannot fail to be very beneficial, while the expense would be inconsiderable and much valuable information would be obtained, which would be highly useful in the event of the prosecution of the work afterwards on an extended scale.

It is due to Capt. A. F. Cotton and Lieut. F. Cotton to make known to the right honourable the Governor in Council the valuable and zealous assistance afforded by both officers in the performance of the duty at Paumbun. The survey and experiments were, with the permission of Government, placed under the direction of the former officer, and have been conducted by him to my entire satisfaction, and with great skill and judgment.

Fort St. George,
21 November 1829.

(signed) *D. Sim*, Major,
Inspector-Gen. of C. E.

East India House,
10 July 1837.

JAMES C. MELVILL,
Secretary.

Appendix, No. 6.

Appendix, No. 6.

Letter and Report on Hall's Condensing Apparatus.

LETTER from *J. Barrow*, Esq., to *F. W. Mullins*, Esq., M. P., transmitting REPORT of *T. Lloyd*, Esq. and *J. Kingston*, Esq., on the Trial of *Hall*'s Condensing Apparatus.

Sir,

Admiralty, 11 July 1837.

I AM commanded by my Lords Commissioners of the Admiralty to transmit to you herewith, in compliance with a precept of the Select Committee of the Honourable House of Commons on Steam Navigation to India, dated the 6th instant, a copy of the Report of Thomas Lloyd, esq. and John Kingston, esq., engineers, on the trial of Hall's Condensing Apparatus.

I am, &c.

John Barrow.

Appendix, No. 6.

Letter and Report on Hall's Condensing Apparatus.

Sir, *Woolwich Yard, 7 August 1831.*

Agreeably to your Minute of the 1st instant, directing us to inspect and report upon the apparatus for the condensation of steam, invented by Mr. Hall, and fitted by that gentleman on board the "City of London," we beg to state that, on the 5th instant, we proceeded in that vessel to Ramsgate, and returned in her on the following day.

During the time we were on board we had a full and satisfactory examination of the means employed to effect the above object, and also of the results produced by them.

We now beg to lay before you the principal evils arising from the common mode of condensation, which is the injection of cold water; the manner in which the steam is condensed by Mr. Hall; and our opinion founded upon the actual performance of the engines, of the efficiency of the means which he has employed.

Evils arising from the present mode.

As condensation is now effected, the greater part of the condensed steam never returns to the boilers, because it is mixed with a far greater quantity of injection water; which, when the vessel is at sea, must, of course, be salt water. Hence, in this case, steam which contains no salt, is continually leaving the boilers; and water almost as salt as sea-water is continually supplying its place. The consequence of this would be, if no means were taken to prevent it, that the boilers would, in a short time, be entirely filled with salt.

In order, however, to prevent this, a portion of the water in the boilers which is considerably salter than sea-water, is periodically driven into the sea, and its place supplied with water a little less salt than the sea; the condensed steam forming a small portion of it. The water in the boilers is in this manner kept from exceeding a certain degree of saltness, but whatever care is taken, in long voyages especially, salt will accumulate, and sometimes in great quantities, and of great hardness, so that it is with difficulty it can be removed.

Boilers are thus often injured as much in a few months, as they would otherwise be in as many years.

The other evil, necessarily resulting from this state of things, is (besides the rapid destruction of the boilers) a great waste of fuel, occasioned by the difficulty with which the heat passes through the incrustation on the inside, by the leaks which are thereby caused, and by the practice of "blowing out" periodically, as before mentioned, a considerable portion of the boiling water.

The manner in which the steam is condensed by Mr. Hall.

The obvious and, indeed, the only method to prevent the evils we have just described, is to return to the boilers the whole of the condensed steam; and this can be effected in no other way than by condensing it by means of cold surfaces, without any admixture of sea-water. This is accomplished on board the "City of London" by means of a vast number of small thin tubes into which the steam passes, and the heat is abstracted from it by an abundant supply of cold water on the outside; the whole being contained in two iron casings, each of which is about six feet long, four feet high, and five feet wide, placed at the fore part of the engines, which are of the collective power of 100 horses.

Efficiency of the new mode.

Such a mode of condensation is a desideratum which for many years has occupied the attention of engineers and others; but if we except Mr. Howard, who has succeeded in applying a similar principle to his "Vapour Engine," we may safely assert that very little success has hitherto attended their efforts. The application of Mr. Hall's method, however, is so successful as to leave nothing to be wished for, the power of the engines is not in our opinion diminished; and there is no reason to fear that the apparatus will not be durable, as it is not exposed to a degree of heat sufficient to injure it.

We have omitted to mention many advantages which would be derived from the application of this system of condensation, such as increased durability of certain parts of the engines, and the prevention of accidents, through carelessness or otherwise, arising from the condenser and air-pump becoming choked with injection water, and the additional security against the boilers being burnt, in consequence of the water in them being suffered to get too low.

These advantages and all others appear to us to be of secondary importance, when compared with the great increase of the durability of the boilers and the saving of fuel which must necessarily obtain.

We may observe, in conclusion, that the means of preventing a waste of steam when the engines are stopped, and the supplying of the boilers with distilled water to make good the loss occasioned by casual leakage, have been well considered by Mr. Hall, and he has adopted some ingenious and practicable contrivances to effect all that is necessary.

We are, &c.

(signed) *W. Lloyd,*
J. Kingston.

Capt. Supt. Warren, C.B.
Woolwich.

Appendix, No.

Appendix, No. 7.

Description of Heavandoo Pholo.

DESCRIPTION of *Heavandoo Pholo*, the Northern Atoll of the Maldive Islands, by Lieutenant *T. Powell*, I. N., Assistant Surveyor, referred to in the Evidence of Major Head, 13 July 1837, (with a Map).

Geographical Site.—THE Atoll Heavandoo Pholo, or Head of the Maldives, situated upon the meridian of Bombay, and between the parallels of 7° 7′ and 6° 55′, north latitude, consists of 22 islands, two islets, and two sand-banks, besides several small shoals and two large barrier reefs; the latter from the boundary of the Atoll to the S. W., W. and N. W., and along the outer edge, are dry at low water spring-tides; outside they are steep, having 50 and 60 fathoms close to them, and no ground at 150 fathoms at the distance of 300 yards.

The northern or principal barrier has ten islands and two small islets on it; one of the latter on its southern extremity being close to Heavandoo; these are all situated on the inner side of the reef, having three or four, and in some places six fathoms water, between them and its outer edge, with small channels for boats between each, formed by the natives having cleared away the coral rocks. Nearly in the centre of the Atoll there are three small islands; the eastern side is clear of shoals, with the exception of two small patches between Gullandoo and Mooradoo; but on the western there are several nearly dry, and some sunken patches, having from three to ten fathoms on them. The soundings vary from 20 to 34 fathoms, the latter being the greatest depth of water obtained.

Population.—Of the 22 islands composing this Atoll there are only seven inhabited, viz. Heavandeo, Koorafooree, Katefooree, Turracoon, Colligaum, Beeramerdoo and Mooradoo. In the margin* I have noted the number of inhabitants and boats upon each, by which it will be seen that the population, including men, women and children, does not exceed 760 individuals. The boats are all employed in fishing; the trade between this Atoll and Tilla Dow Madow, whence they are supplied with such articles as they require, being carried on in those of the latter.

*Islands.	Population.		No. of Boats.
Heavandoo -	150	- -	6
Koorafooree	160	- -	5
Katefooree -	70	- -	3
Turracoon -	50	- -	2
Colligaum -	150	- -	4
Beeramerdoo	30	- -	2
Mooradoo -	150		

The islands are so similar in form and natural productions, that it would be a waste of time to describe them separately; I shall therefore give a sketch of Heavandoo, the island of greatest importance in this group, not so much on account of its size as from its being the residence of the Sultan's Vizier when he visits the Atoll. It is of a triangular form, about one mile in length, and is composed of coral, elevated about 12 feet above the level of the sea; the western side is thickly covered with cocoa-nut and bread-fruit trees, and the northern and eastern with thick brush-wood; the interior, which is three or four feet lower than the sides, has been cleared by the inhabitants for the purpose of cultivating a small grain called bimbo: the supply, however, which with the exception of a few sweet potatoes, pumpions and limes, forming the only vegetable production of the island, is not sufficient for their support. The village consists of about 50 huts and 150 inhabitants, stands on the S. W. side; the huts, surrounded by spacious inclosures, are in general constructed of a frame-work of the wood of the cocoa-nut tree, the interstices filled up with leaves, stitched together, and the roof neatly thatched with the same material. In the vicinity there are good paths intersecting the island in different directions, which being kept remarkably clean by the women, form pleasant walks, shaded from the sun by the thick foliage of the cocoa-nut and other trees. Like the natives of the other Atolls they gain their livelihood by fishing. Cocoa-nuts, and the fish called by them grom-bemus (boneta), which are caught in great quantities, form their principal food. Rice being imported, is very scarce, and only procurable by the better class of inhabitants. Fresh water is plentiful, wells having been dug in almost every quarter of the island, but the best is procured from those situated in the burying ground. Fowls are abundant on the islands, but not easily procured, being remarkably wild and difficult to catch, and the natives too indolent to take the trouble necessary to secure them. Money, for which they have little use, will not fetch its full value, rice, tobacco and betel-nuts being the best medium of barter.

WEATHER.

October.—The winds moderate and variable from W. S. W. to N., with cool, pleasant weather, and occasional hard squalls, accompanied by heavy showers of rain.

November.—Light breezes from N. N. E. to N. N. W., and occasional squalls from the eastward until the 22d, when dark cloudy tempestuous weather and incessant rain set in from the W. N. W.; on the 27th it cleared up, and continued fine for the remainder of the month.

December.—Moderate breezes, generally from E. N. E., with pleasant, clear weather, occasionally from E. S. E. with squalls and rain. During these three months, the mean temperature

Appendix, No. 7.

Description of Heavandoo Pholo.

temperature of the atmosphere ranged from 80° to 84°, frequently decreasing in the squalls to 78°; the tides are extremely irregular, and at all times influenced by the prevailing winds and currents.

During the strong westerly breezes the flood set to the eastward, and continued to run for the greater part of the day, but when they moderated, the ebb, in like manner, set to the westward, the water falling six or seven inches lower than I had ever seen it before, even on the springs.

In moderate weather, when the tides flow with somewhat greater regularity, the ebb always runs an hour and a half longer than the flood.

The rise and fall of water is then about five feet, and the velocity about a mile and a half per hour.

In October, November and December, the current to the westward of the Atoll set to the southward, at the rate of 36 miles per day; the natives say that it commences about the middle of September, and continues to the end of December, when the easterly winds set in, then turns to the westward, and runs in that direction until April.

Of this group, I conceive Heavandoo Island is better adapted than any other for a coal depôt; it lies nearly in a direct line between Point de Galle and Socotra, at about one-third of the whole distance from the former place, is easy of access in every direction, and possesses safe anchorages for ships and steamers in all seasons. During the S. W. monsoon a vessel could anchor on the east side of the island, between it and a small reef, dry at low water; in the N. E. monsoon the best anchorage is in the channel, between the island and the south barrier reef, in 16 or 17 fathoms, sand and rocks: opposite both these anchorages there are good landing places for boats, which are procurable in sufficient numbers, and may easily be made available for the landing or shipment of coals, &c. The natives, who are civil and peaceable, might, I think, be induced to work for a small hire, such as rice, tobacco, &c., or any other remuneration they might consider adequate.

In approaching Heavandoo Pholo Atoll from the eastward a vessel ought to sight Kilah, northernmost island of the Tilla Doo Mattee Atoll, and then steer across the channel to Heavandoo Island, passing close to Gullandoo, to avoid the small patches between it and Mooradoo.

Appendix, No. 8.

Appendix, No. 8.

Extract of a Letter from Capt. Johnston to Lord Wm. Bentinck.

EXTRACT of a LETTER from Captain *Johnston*, Superintendent of Steam Vessels in the Ganges, to Lord *William Bentinck*, dated Calcutta, 3 January 1837, delivered in by the Right Hon. Lord William Bentinck, 14 July 1837.

My Lord,

I HAVE just laid before the Government a report on the progress of internal steam navigation in India, with a request for eight additional iron steam-boats, and six accommodation vessels, to meet existing demand. The statements sent home exhibit: "First, the expense at which the four pairs of iron boats have been established; Secondly, that at which they will be maintained; Thirdly, the actual return for 12 months, showing a surplus of nearly one lac of rupees (10,000 *l.*) over an annual charge of two lacs, comprehending every possible item of expense, interest, depreciation, &c.

(signed) *James H. Johnston.*

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Berenice Steam Vessel. Instructions have been given to the Governor-general of India to place this vessel between Mocha and Bombay, *Waghorn* 1——She is likely to answer the purpose for which she is intended; speed with which she made her passage from Scotland against a strong breeze, *Hobhouse, Ev. p.* 21——A steamer like the Berenice could go through the Straits of Babelmandel, and thence to Suez, without any difficulty, *Wellstead* 437–444——Description of her; average consumption of coal, and number of miles she ran daily in the voyage to Bombay; the coal was sent direct from Wales, *Peacock* 508–510. 527–538——The run of the Berenice; her consumption of coal; why less than that of

Berenice Steam Vessel—continued.
of other vessels, *Peacock* 518–524. 537, 538——Calculations respecting the space the Berenice might have for cargo; a cargo from India during the south-west monsoon is out of the question; as much coal as possible should be taken, *Peacock* 765, 766——Could make a passage direct from Bombay to Socotra during the south-west monsoon, but it would not be advisable to do it, *Brucks* 1830–1837——Is a very fine vessel; witness would not have put so much power or weight in her; would have given her a greater rise in the floor, *Morgan* 1363——Statement of the size, horse power and guns of the Company's steamer Berenice, *App. p.* 201.——*See* also *Hoogly to Madras.*

Beyrout or *Berut.* In 1835 the President of the Board of Control extended the voyage of the Alexandria steamer to Beyrout, in order to communicate with Colonel Chesney and the Euphrates expedition, *Hobhouse, Ev. p.* 14——A dromedary post was established between Beyrout and Damascus, to co-operate with the Euphrates expedition, *Hobhouse, Ev. p.* 15.——*See* also *Damascus.*

Boilers. Evidence respecting copper and iron boilers, *Peacock* 597–611——Mode in which the boilers of locomotive engines are to be supplied with water, *Galloway* 906–908——The process of incrustation in boilers explained, *Lardner* 1587——Copper boilers should be used in case Hall's condensers are not used; they are double the expense, *Lardner* 1620, 1621.——*See* also *Coals*, 2. *Lime.*

Bolack. There is one of the first iron foundries in the world at Bolack, *Galloway* 899.

Bombay. Number and size of vessels required for effecting the communication with Bombay, *Peacock* 497–501. 539, 540——In 1836 three over-land mails reached Bombay in fifty-eight, forty-five and sixty-four days, *Turton* 992——Estimate of receipts by steam communication between Bombay and England, *Head* 1172, *Ev. p.* 99——Estimate of the expense of communication with Bombay, *Melvill* 1268–1279——If steam communication were restricted to Bombay, passengers, including women and children, could go dauk to Calcutta without difficulty; occasional impediments would arise, especially from heavy rain, *Melvill* 1317–1325——There would be no difficulty in establishing regular steam navigation between Bombay, Galle and Socotra; course a steamer should take: distance, rate and time calculated; description of vessel required, *Brucks* 1850–1857. 1875, 1876——The commercial gentlemen of Bombay contemplate the establishment of a private steamer to Ceylon; another is about to be sent to Calcutta, *Grindlay* 1920–1923.
See also *Agra. Despatches. Dundra Head. Plan for effecting a Steam Communication with the three Presidencies of India. Suez to Bombay.*

Bombay to Calcutta. The high rate of postage from Bombay to Calcutta would diminish the number of letters by steam; reason why they would go much cheaper by dauk, *Peacock* 749–761——Few passengers would pass by land between Bombay and Calcutta, if there were a communication by steam; ladies or their families could not possibly do so; the road is available by night only, *Turton* 1019, 1020——Number of steamers required for communication with Bombay and Calcutta *Melvill* 1259, 1262——It would take sixteen days to go dauk from Calcutta to Bombay, and forty-nine to reach England by steam, making sixty-five days in all; but a month might be lost at Alexandria by not reaching it exactly when the packet is starting, *Peacock* 797, 798——Description of the over-land route between Calcutta and Bombay; average time occupied in passing over: the various impediments, *Elliott* 1475–1489.

Bombay to Madras. See *Madras and Bombay.*

Bombay to Mocha. See *Mocha to Bombay.*

Bombay to the Red Sea. See *Red Sea to Bombay.*

Bombay to Socotra. A passage might be made direct from Bombay to Socotra during the south-west monsoon, which is violent only within thirty or forty leagues of the coast of Bombay, *Nairne* 219, 220——The distance is upwards of twelve hundred miles; in case of the wind being very strong, a course to the eastward of south should be taken, *Nairne* 224–227——Not be necessary to go so far south as Goa; the wind never blows hard more than three days in the full and change, *Nairne* 228, 229——The passage from Bombay to Socotra, a distance of twelve hundred miles, too long for a steamer to make in the face of the south-west monsoon; she could not carry coal enough, *Dunn* 341–344. 358——If any accident happened to her machinery, she would have to go back to Bombay, *Dunn* 347——A steamer making a voyage from Bombay to Socotra would fall into the same track as the Point de Galle steamer that had passed through the eight-degree channel, *Dunn* 348–350——Evidence respecting voyages from Bombay to Socotra in a sailing vessel during the south-west monsoon; time occupied and course taken; weather generally fine the whole way, even during the south-west monsoon, *Wellstead* 384–400.——*See* also *Atalanta Steam Vessel.*

Bombay and Suez. Estimate of expense of a monthly communication between Bombay and Suez by four steamers of two hundred horse power, *Hobhouse, Ev. p.* 19——Explanation of the present plan of steam communication from Suez to Bombay; it will be a considerable time before it can be realized, *Peacock* 836–840——Persons sending letters to India must not yet rely upon steam conveyance; more steamers will be built immediately, *Peacock*

836–840——Estimate of expense for communication between Suez and Bombay, *Head* 1172, *Ev. p.* 100——Estimated expense of running three steam vessels as packets between Bombay and Suez, each vessel to be from seven hundred to seven hundred and fifty tons, *Brucks* 1885, *p.* 174.

Bombay Government. Two steam vessels should be given to this government to be disposed of as it may think fit, *Waghorn Ev. p.* 2——Sentiments of the government of Bombay respecting steam communication; the same warm interest felt in it throughout India, especially in Calcutta, *Turton* 993–997.

Bombay Marine. Propriety of converting that force into a steam flotilla, *Hobhouse, Ev. p.* 22——Should be abolished, *Lord Bentinck* 1944.

Boulogne. The Boulogne steamers had one thousand persons a day, in consequence of the reduced fares, *Lardner* 1573.

Briggs, Samuel, Esq. (Analysis of his Evidence.)—A merchant in London, of the house of Briggs, Thornburn, Acraman & Co., and at Alexandria, in Egypt, of the house of Briggs & Co.; has resided, at various periods, above twelve years in Egypt, 1432, 1433——About twenty years ago visited Bombay, by the route of the Red Sea, embarking at Suez, and returning by Cosseir; object and results of his voyage, 1434——The Pacha Mahomed Ali affords protection to trade and travellers wherever his power extends, but to ensure his co-operation, it would be requisite to negotiate with him on these points; he may consent to a modification of the custom duty, 1435. 1451——The transit of merchandize through Egypt unopened, could only be arranged by special agreement with him; conditions which might obtain his consent, 1436——Enumeration of the articles of merchandize most likely to be conveyed by steam vessels from England to India, and *vice versâ*, 1438——Mode of packing by which the plague and other infection might be entirely excluded from these packages, provided they passed unopened through Egypt, 1439——General information respecting the plague in Egypt; much merit due to the Pacha for his endeavours to prevent its introduction from Constantinople and elsewhere, 1440–1446.

A full account of the Isthmus of Suez and of the Desert between Cosseir and Keneh or Thebes; wells, roads and mode of travelling; equipments and provisions necessary for the journey, 1441–1457——Improvements suggested, by which the comfort and convenience of passengers might be increased, 1441——It would be good policy in the Pacha to encourage Indian and Maltese settlers, 1441——The Pacha is disposed to make carriage roads across the Isthmus and the Desert; two landaus are now building for him, 1442——His famous canal of Mahmoudia, between Alexandria and Cairo; all passengers and goods go by it to Cairo, and thence by Suez or Cosseir to the Red Sea, 1442——The Pacha has had rails sent from England to construct a railway across the Isthmus, 1442——No danger to be apprehended from the Arabs, 1443. 1457–1466——Monthly communication with India would cause many small articles to go by the Red Sea which now go by the Cape; but to send general cargo by steam would injure our trade by the Cape, and thus affect one of our best nurseries for seamen, 1444——Insurance of articles going by steam, 1445. 1447–1450——Remarks upon the routes by the Gulf of Akaba, in case of plague or war in Egypt, 1446——Nothing is likely to interrupt our intercourse with India by way of Egypt but civil war; circumstances that may give rise to it, 1453–1456——Remarks upon the ports of Cosseir and Suez, 1465–1469——Trade with Abyssinia might increase under favourable circumstances, but the country is always in a state of civil war, and consequent insecurity, 1470–1472.

Brucks, Captain *George Barnes*, of the Indian Navy. (Analysis of his Evidence.)—Has been thirty-one years in India, five of them in the Royal Navy; twenty-seven years constantly at sea, 1822–1823——Socotra would make a good depôt, as far as anchorage goes, 1824–1826——It is desirable to find anchorage for a floating depôt, under Cape Guardafui or Cape Felix, 1827——The Atalanta and Berenice would make a passage direct from Bombay to Socotra during the south-west monsoon, but it would not be advisable to do it, 1830, 1831——Proper course indicated; description of south-west monsoon, and the points from which it blows, 1834, 1835——Remarks respecting the gales in the Bay of Bengal and Bombay seas, 1836–1843——Description of a voyage to Point Palmyras during a strong south-west wind, 1844——Point de Galle might be made efficient head-quarters for steamers, on a considerable outlay; it would be superior to Trincomalee in every respect, 1845——No difficulty in establishing regular steam navigation between Bombay, Galle and Socotra; course a steamer should take; distance, rate and time calculated; description of vessel required, 1850–1857. 1875, 1876.——The system of piracy in the Persian Gulf described; depredations of the Arab chief Abothubby; steamers should be employed not only for the purposes of communication, but of safety and protection, 1859–1868——Number required for the Red Sea and Persian Gulf; their duties defined, 1869–1873——Camaran objected to as a depôt, 1878——But one needed between Bombay and Suez, and that should be Perim, 1880——Estimate of the expense of the depôts and fuel given in, 1885.

Bunder Delechee. Is sheltered from the violence of the south-westerly winds by the mountains that rise up close by the shore, *Wellstead* 436.

Burdwan Coal. See *Coals*, 2. 4.

C.

Cairo. English engineers obtainable at an hour's notice from Cairo to repair vessels at Suez, *Waghorn* 53.
See also *Alexandria to Suez. Cosseir to Cairo. Maltese Labourers. Mokattam Hills.*

Cairo to Adfa. Distance from Cairo to Adfa by the Nile, *Galloway* 875.

Cairo and Suez. Wheel carriages are constantly used for passing over the deserts between Cairo and Suez, *Waghorn* 194——Passengers could go from Suez to Cairo without difficulty, *Wellstead* 487–489——The Pacha of Egypt has materials for forming a railroad from Cairo to Suez, *Peacock* 805–809——If there was a railroad from Cairo to Suez, engineers and workmen could be brought over in three or four hours, *Galloway* 906——A well has been discovered half way between Cairo and Suez; borings have been made, and good water found at the depth of two or three hundred feet, *Galloway* 909-914——For persons who are going for dispatch Suez would be the best station; those going for pleasure would prefer Cosseir, *Head* 1138——Account of the Isthmus of Suez and of the Desert between Cosseir and Kench or Thebes; wells, roads and mode of travelling, &c., *Briggs* 1441. 1457——Improvements suggested, *Briggs* 1441——The Pacha of Egypt has had rails sent from England, for the purpose of forming a railway across the Isthmus of Suez, *Briggs* 1442——The rail from Cairo to Suez surveyed by Galloway Bey in 1834, by direction of his Highness the Pacha of Egypt, referred to in the Evidence of A. Galloway, esq., 28 June 1837 (with a map), *App. p.* 202.

Calcutta. Statement of the wishes of the Calcutta community upon the subject of steam communication with India, *Turton* 969, 970——Should be one of the depôts for coals, *Barber* 1061, 1062.
See also *Coals. Dauk. Despatches. Hoogly. Letters and Newspapers. Postage.*

Calcutta to Agra. See *Agra.*

Calcutta to Bombay. See *Bombay and Calcutta.*

Calcutta to Canton. Voyage from Calcutta to Canton in the Forbes steamer, towing another vessel, *Henderson* 932–939. 945, 946. 951.

Calcutta to Madras. See *Hoogly to Madras.*

Calcutta and Mocha. See *Mocha and Calcutta.*

Calcutta and Point de Galle. Two more steamers requisite between Point de Galle and Calcutta, *Peacock* 541-543——Under favourable circumstances a well adapted steamer could make the passage from Calcutta to Point de Galle in six or seven days; her average run would be 150 miles a day, *Peacock* 665-670——Not the smallest difficulty in making the passage from Calcutta to Point de Galle in the south-west monsoon, *Barber* 1027——Gales seldom occur, and last only 24 hours, *Barber* 1028.

Calcutta to Socotra. See *Socotra and Calcutta.*

Calcutta and Suez. The larger the steamer the better for the voyage between Calcutta and Suez, *Dunn* 355-357——The charge for passengers from Calcutta to Suez should be greater than from Calcutta to England by a sailing vessel, because the expense of sending a steamer to Suez is far greater, *Peacock* 712–729——It would be better to have two distinct lines from Calcutta to Suez, making them meet upon the Desert; by the proposed arrangement there would be no detention either way, *Turton* 1007.

Calvert, Mr. His proposition for effecting a steam communication with India, *App. p.* 199.

Camaran, Island of. Objections to a steam establishment being formed at the Island of Camaran, *Waghorn* 51, 52——Further objections to the Island of Camaran as an establishment for steam vessels; a bar extends itself entirely across the entrance, *Waghorn* 82–101——There is no bar at its entrance, *Head* 1127-1132——It is a good harbour, and partially susceptible of cultivation; no difficulty in the navigation into the harbour *Wellstead* 446–463. 473, *Peacock* 571, *Turten* 991, *Head* 1127–1132——Is nearly as good for a port as Perim, and more convenient for the passage to Secotra, as it divides the distance better, *Turton* 991——Is one of the best places that can be obtained as a coal depôt, *Peacock* 571, *Head* 1091–1098. 1127–1132, *Lardner* 1566, 1567.
Objections to, as a depót for coals, *Brucks* 1880——A lucrative trade might be drawn to Camaran by establishing a European market, *Head* 1133——This island particularly recommended as a station for steamers, *Lardner* 1566, 1567——Would be under our own control, and safe from the incursions of the Arabs, *Lardner* 1568——Suggestion respecting the placing of hulks there, furnished with fuel, workshops and duplicates of machinery, *Lardner* 1568——The general opinion among the naval officers of the Red Sea is in favour of Camaran as a depôt, having a good harbour, with a sufficient quantity of water for a steamer, *Mackenzie* 1666, 1667.——*See* also *Coals*, 4. *Depôts for Coals.*

Camfida. Objectionable as a depôt, from the indifferent anchorage it affords, *Wellstead* 470.

Report, 1837—*continued.*

Canton. See *Calcutta to Canton.*

Cape of Good Hope. The Cape of Good Hope route recommended for letters and passengers to Calcutta, that of the Great Desert and Persian Gulf to Bombay; the length of that passage would be 11,500 miles, the time 60 days; vessels to be changed at every station; twelve would be required, *Peacock* 799-804.——*See* also *Commerce.*

Captains of Vessels. The captain of a steamer should be conversant with the details of the engine, otherwise he will be the slave of the engineer, and cannot manage a vessel so far from Europe, *Lardner* 1616.

Carnac, Sir *J.* See *Court of Directors.*

Cashmere Shawls. A house in Paris is already in treaty with their Bombay agents for Cashmere shawls by the route of Mocha, *Waghorn* 116, 117.

Ceylon. In the passage from Ceylon to the mainland a steamer might pass between the Bassas and the island, *Nairne* 249, 250——The barometer generally gives two days' notice of an approaching gale on the east coast of Ceylon, *Dunn* 351, 352——Estimate of receipts for steam communication with Ceylon in excess of the same to Bombay only, *Head* 1172.——*See* also *Despatches. Letters and Newspapers.*

Ceylon to Australia. See *Merchants.*

Clipper. A ship built for fast sailing, *Henderson* 929, 930.

COALS:

1. *Generally.*
2. *Coal best suited for Steam Vessels.*
3. *Mode of Conveyance, &c.*
4. *Price of Coals in India, &c.*
5. *In Syria.*

1. *Generally:*

To save the time occupied in taking in coals, it would be better to have another vessel ready, *Peacock* 502-507. 671-675——Coals might be laid out at Mocha, Jidda and the Island of Heavandoo, *Head* 1157-1161——Quantity of coal a steamer of six hundred and fifty tons ought to take for a voyage to India, what run it would enable her to effect, and at what rate per day and hour, *Morgan* 1356-1361——The limit which is imposed to the supplying coals to a steam-ship is not a limit of space, it is a limit of immersion, *Lardner* 1557.

2. *Coals best suited for Steam Vessels:*

Burdwan coal will only do for short stations and local purposes on the rivers and coasts of India; it is thirty-five per cent under the quality of Welsh coal, *Waghorn* 1, *Ev. p.* 2——The only Indian coal available for navigation is the Burdwan; charge for its freight, *Peacock* 553 559——The best description of coal to send across to Suez would be that taken out in ballast by the Liverpool vessels; this mode of supply would also be the most economical, *Head* 1152-1155——Qualities of the different sorts of coal, *Oliver* 1816-1820——The better the coal the greater the advantage to the boiler, and the less the consumption the less injurious the effect on the boiler, *Oliver* 1818.

3. *Mode of Conveyance, &c.:*

They should be sent direct from England to Bombay, Trincomalee and Calcutta by way of the Cape of Good Hope, *Waghorn* 1, *Ev. p.* 2——The coals for Suez and the Red Sea above Mocha should be conveyed to Alexandria and there discharged into an iron flat boat, built expressly for the Nile, *Waghorn* 1, *Ev. p.* 2——Can be obtained at Madras; you cannot always touch at Madras, *Peacock* 676——Coals might be transported from Mocha to Aden, which might be made the station, *Melvill* 1240.

4. *Price of Coals in India, &c.:*

Evidence respecting the price and consumption of coals, *Peacock* 560-573——Price of the best Burdwan coals; if additional facilities were given for bringing them to the coast considerable demand and lower prices would be the result, *Turton* 1014, 1015——Price at which coals could be supplied to Socotra, Camaran and Suez; mode of conveyance, *Head* 1153-1156——Mr. Peacock's evidence respecting the cost of coal for the Hugh Lindsay on a voyage between Bombay and Suez is not correct data for the present day, *Head* 1162, 1163——By having coal at Aden instead of Mocha, 10*s.* per ton will be saved; expense occasioned by the fixed winds in the Red Sea, *Head* 1167, 1168——Probable cost of coal in India and in the Red Sea, *Lardner* 1608-1615.

5. *In Syria:*

Some very superior coal and iron have been discovered in Syria within 18 miles of the sea, *Galloway* 914-917——Those found in Syria are supposed to be applicable to steam navigation; it is in progress of experiment, *Head* 1151——Whether it would be desirable to work the mines in Syria, since coal may be delivered at Alexandria from this country at a very moderate cost, *Head* 1152, 1153.

See also *Depôts for Coals. Steam Vessels,* 1.

Cochin. Recommended as the starting and arriving point for Indian passengers; no difficulty in steamers entering the harbour during the south-west monsoon; sailing vessels could not, *Sim* 1225, 1226——It might be made a point of great commercial importance, *Johnstone* 1893.

Coffee. See *Massouer.*

Collyer's Boilers. See *Pluto Steam Vessel.*

Commerce. The merchants in Egypt expect to derive great advantage from our steam intercourse with India, in consequence of the traffic that will grow up from it, *Waghorn* 107, 108, *Mackenzie* 1669, 1670—— There is a great deal of traffic in Egypt, and much more might be created; enumeration of articles, the sale of which would be increased by facility of conveyance, *Galloway* 872, 873, *Briggs* 1438——The Australian merchants are very anxious for the establishment of a steam communication with India, and propose carrying it on from Ceylon to Australia, *Barber* 1040–1045——Commercial men doubt the importance of rapid communication; they do not want the bills to anticipate the goods, *Peacock* 768——Enumeration of articles of merchandize most likely to be conveyed by steam vessels from England to India, and *vice versâ*, *Briggs* 1438—— Monthly communication with India would cause many small articles to go by the Red Sea which now go by the Cape; to send general cargo by steam would injure our trade by the Cape, and thus affect one of our best nurseries for seamen, *Briggs* 1444.

See also *Egypt. Plan for effecting a Steam Communication with the three Presidencies of India*, 2.

Comprehensive Plan. See *Plan for effecting a Steam Communication with the three Presidencies of India.*

CONDENSERS:

1. *Generally.*
2. *Hall's Patent Condensers.*
3. *Howard's Condensers.*

1. *Generally:*

Difference between Howard and Hall's principle of generating steam, *Lardner* 1605–1607.

2. *Hall's Patent Condensers:*

They are absolutely necessary for Indian steamers; objections to them answered; they have been under experiment for two years and have not once failed, *Morgan* 1418–1424——Iron boilers can be used with them, because they entirely prevent incrustation, and they also render Welsh coal more valuable, *Morgan* 1425, 1426, 1428, 1429——Contrivance by which they obviate the liability to incrustation, *Morgan* 1430——Evidence respecting the structure and efficiency of them; they require the test of longer experience before they can be used on the Asiatic side of Egypt, *Lardner* 1591——Recommended for steam vessels employed on this side of Egypt, because always within reach of repairs, *Lardner* 1594——They keep the boiler clean, spare its wear and tear, and save fuel; number of vessels constructed upon that principle; the condensers should be applied to the steam communication with India, *Kingston* 1694–1730——They seem to promise well, *Oliver* 1804–1815——Letter from J. Barrow, esq. to F. W. Mullins, esq. M. P., transmitting report of T. Lloyd and J. Kingston, esqrs. on the trial of Hall's condensing apparatus, *App. p.* 215–217.

3. *Howard's Condensers:*

His plan for generating steam; it has not obtained that point of certainty which would warrant its adoption even on this side of Egypt, and much less on the Asiatic side, *Lardner* 1605–1607.

Copper Boilers. See *Boilers.*

Correspondence with India, &c. If a communication by steam vessels from England to Calcutta be effected in a passage of about two months, the greater portion of private correspondence could take that channel, *Elliott* 1450——Comparative amount of correspondence and mercantile intercourse between the different presidencies and this country, *Lardner* 1581——Supposed number of letters which would go by the Red Sea instead of the Cape, notwithstanding the present difference of postage, *Lardner* 1582, 1583.

Cosseir. The harbour is safe, *Head* 1169——Is very small; it is not good anchorage when the wind blows from the east or north-east, *Briggs* 1467–1469.——*See* also *Wells.*

Cosseir to Cairo. Despatch sent from Cosseir to Cairo in seven days; it was sent as a matter of course by an ordinary Arab conveyance, *Head* 1141——Description of the iron boats which would be required upon the Nile for the purpose of carrying on the communication between Cairo and Cossier, *Head* 1149, 1150.

Cosseir and Mocha. Distance between Mocha and Cosseir is seven hundred and eighty miles, *Waghorn* 7.

See also *Suez and Cosseir.*

Cotton. See *Massouer.*

Court of Directors. Mr. Melville's letter, communicating to the Board of Control their views with respect to steam navigation to India; apportionment of expense, postage, &c., *Ev. p.* 16——Letter of Sir J. Carnac, proposing the trial of steam communication between London and Bombay, and dauk from Bombay to Madras and Calcutta, *Ev. p.* 18.

Currents. See *Point de Galle. Red Sea,* 1.

Curtailment of Space. None of the late plans for curtailment of space in steamers have yet undergone the test of experience, *Morgan* 1410–1412.

Customs Duties. See *Pacha of Egypt.*

D.

Damascus. Dromedary posts established from Bagdad to Damascus, and from Damascus to Beyrout, to co-operate with the Euphrates expedition, *Hobhouse, Ev. p.* 15.

Dauk. The government of India have accelerated the dauk so as to convey packets from Bombay to Calcutta in eight or ten days, and to Madras in seven days, *Ev. p.* 18——Mode of carrying the dauk, *Elliott* 1484–1490——Information respecting the dauk-banga, and the passage by sea from Bengal to Bombay, *Elliott* 1490–1499——Memorandum showing the shortest time hitherto occupied by any one dauk between certain places, in March, April and May 1835, *Elliott, p.* 129——In the event of steam communication being confined to Bombay, all passengers, except single men, would go to Calcutta and Madras by the Cape of Good Hope, to avoid the overland journey to Bombay, *Johnstone* 1901, 1902.

Deposits in Boilers. See *Lime.*

Depôts for Coals. See *Arabia. Camaran,* Island of. *Felix, Cape. Guardafui, Cape. Heavandoo* or *Heawandee,* Island of. *Hodeida. Jidda. Macullah. Madras. Perim,* Island of. *Point de Galle. Socotra,* 2. *Soheia. Stations. Tamarinda Bay. Trincomalee. Yambo.*

Desert of Cosseir. See *Wells.*

Desert of Suez. See *Suez.*

Despatches. Public despatches and correspondence are at present conveyed between England and Calcutta almost entirely by sailing ships, and not by the overland despatch, *Elliott* 1475, 1476——Return of the number of bags and boxes of despatches sent to and received from Ceylon, Bombay, Madras and Calcutta, by private ships, in three years ending 5th October 1834, 1835 and 1836, *App. p.* 198.

Directors of the East India Company. See *Court of Directors.*

Donderahead. See *Dundra Head.*

Dromedary Posts. See *Damascus.*

Dundra Head. The passage round Donderahead to Bombay has been made several times, *Henderson* 925–931——A steamer would easily encounter the current going round Dundra Head; but in the south-west monsoon the best passage from Galle to Socotra would be through the one-and-a-half degree channel, *Barber,* 1032.

Dunn, Sir *David.* (Analysis of his Evidence.)—Has been post-captain for twenty-four years; was at Trincomalee from 1832 to 1835; is well acquainted with the Bay of Bengal and the shore, 252–255——No difficulty in a good European steamer making the passage from Hoogly to Madras and Point de Galle; her course would be from the floating light to Point Palmyras, and thence close along the shore to Madras; witness has anchored in all parts of the coast in the height of the south-west monsoon, 256–262——Rate at which the Berenice would perform this voyage of about eighty miles, 262–269——The monsoon gales blow home most furiously, but do not last more than thirty-eight or forty hours; are easily avoided, as the barometer acts invariably during these periodical storms, 264–266——The harbour of Trincomalee the only one; a vessel overtaken by a monsoon must make an offing of one hundred miles and lie-to, 268–270——No difficulty in navigating the Bay of Bengal during the north-east monsoon, which is not so strong as the south-west; a steamer could go six or seven miles an hour against the north-east monsoon, 272–274.

The harbour of Point de Galle might be used as a post for steamers, 275–276——Trincomalee would afford ample accommodation for steamers requiring repair if artificers resided there, 277–282——The difficulties which would occur in making the passage from Point de Galle to Socotra enumerated; means of overcoming them; the navigation of the Indian seas not more difficult than that of the Bay of Biscay, 283–304——The strength of the current and power of the south-west monsoon extend to the distance of one hundred or one hundred and fifty miles from the Bossas; a powerful steamer would make way against them at the rate of five miles an hour, 305, 306——Course to be taken afterwards;

Report, 1837—*continued.*

Dunn, Sir *David*. (Analysis of his Evidence)—*continued.*
afterwards; in the event of the machinery breaking, it might be made a sailing passage, 307-312——Information respecting the different rate per mile at which a vessel would accomplish this passage under the modifying influences of wind and current, 313-340——The passage from Bombay to Socotra, a distance of twelve hundred miles, too long for a steamer to make in the face of the south-west monsoon; she could not carry coal enough, 341-344. 358——If any accident happened to her machinery she would have to go back to Bombay, 347.

A steamer making a voyage from Bombay to Socotra would fall into the same track as the Point de Galle steamer that had passed through the eight-degree channel, 348-350——Effects of the moon under the line, 351——The barometer generally gives two days' notice of an approaching gale on the east coast of Ceylon, 351, 352——A steamer would probably receive assistance from some of her sails during the whole passage between Point de Galle and Socotra, 354——The larger the steamer the better for the voyage between Calcutta and Suez, 355-357.

Duties at Mocha. The English flag exempts vessels from paying duty at Mocha; nothing English is taxed, *Waghorn* 71-75.

See also *Massouer. Pacha of Egypt. Transit Duty.*

E.

East India Company. See *Postage. Stations. Steam Navigation to India.*

East Indies. See *Plan for effecting Steam Communication with the three Presidencies of India. Steam Navigation to India.*

Education. The best education India can afford does not qualify an individual for general usefulness to his countrymen, to the same extent as an English education, *Turton* 1012.

See also *Natives of India.*

Egypt. Witness encountered neither difficulty nor danger through Egypt; description of the desert, and the facilities of crossing it, *Turton* 966, 967——Our communications with India through Egypt very dependent upon the ruling sovereign, *Galloway*, 882, 884——Remarks on the advantageous position of Egypt; its commerce would be greatly increased by steam communication with India, *Head*, 1137——Is a very impoverished country, and the money spent by passengers going through it would be of immense benefit to the people, *Head*, 1148——The transit of merchandize through Egypt unopened could only be arranged by special agreement with the pacha; conditions which might obtain his consent, *Briggs*, 1439.

See also *Commerce. Engineers. Labour. Pacha of Egypt. Population. Trade.*

Eight-degree Channel. See *Point de Galle. Socotra.*

El-Arish. See *Akkaba*, Gulf of.

Ellenborough, Lord. When president of the Board of Control, carried into effect the recommendation of the Select Committee of 1834 on Steam Navigation to India, *Hobhouse, Ev. p.* 14.

Elliott, The honourable *John.* (Analysis of his Evidence).—Was postmaster-general in Calcutta from 1829 to 1835, 1473, 1474——Public despatches and correspondences are at present conveyed between England and Calcutta almost entirely by sailing ships, and not by the overland despatch, 1475, 1476——Description of the overland route between Calcutta and Bombay; the average time occupied in passing over, 1477——The various impediments and dangers from heavy rain, inundations, jungles and tigers, 1478-1488——Females and children can never go by this route; the strongest men only at particular seasons, 1489——Mode of carrying the dauk, 1490——Information respecting the dauk-banga, and the passage by sea from Bengal to Bombay, 1490-1499——If a communication by steam vessels from England to Calcutta could be effected in a passage of about two months, the greater portion of private correspondence would take that channel, 1500——Fair rate of postage on letters and newspapers going by steam, adopted by the Court of Directors in February 1835, 1501——Proportion of the whole correspondence likely to be conveyed by steam, 1502——The more the communication can be improved, the greater the number of letters will be, 1504. 1515-1517——The posts throughout the Bengal presidency were accelerated when witness was there, 1505——Delivers in a table showing in what degree they were accelerated, 1506——Whether the Red Sea route would be preferred, if more expensive than the Cape route, 1507-1509——Communication between the different ports of India is desirable, the overland journey from Bombay being so inconvenient, 1518-1522.

Elphinstone, The honourable *Mountstewart.* (Analysis of his Evidence).—A communication with India by steam would be highly advantageous in a political and moral point of view, 1928-1929——The effect of this intercourse on the members of the Company's service; in settlers, missionaries, editors of newspapers, merchants, travellers, and the natives of India, 1930–1932, 1934——No evil consequences apprehended from the influx of natives into England, 1933.

Engineers in Egypt. There are always a good many engineers in Egypt; great many of the natives have been educated as engineers, *Galloway* 900, 901——Steamers coming into Suez in want of repair could be easily repaired, though not with as much dispatch as in England, *Galloway* 902–904.

Falmouth. See *Alexandria and Falmouth.* *Plan for effecting a Steam Communication with the three Presidencies of India.* *Quarantine.*

Falmouth to Suez. The average passage from Falmouth to Suez is twenty-three days, *Peacock* 792–794.

Felix, Cape. Desirable to find anchorage for a floating depot under Cape Felix, *Brucks* 1826.

Field's Paddle Wheels. See *Paddle Wheels.*

Firefly Steam Vessel. Tonnage and horse-power of the Firefly steamer, *Waghorn* 169–171.

Forbes Steam Vessel. See *Calcutta to Canton.*

Freight. But little space for profitable freight in the Red Sea steamers; there would be room for treasure, which is usually considered the perquisite of the captains, *Peacock* 762–764——There would be ample freight for the less bulky articles in large steamers; enumeration of those articles, and the places which would be benefited by the traffic, *Turton* 1016, 1017——Steamers, if regular and of sufficient capacity, would eventually receive freight for India to a considerable amount; at present the natives would be jealous of interference; the rich pilgrims would in a short time make use of them, *Wellstead* 490–493.

Freight and Insurance. Consideration of the comparative rate of freight and insurance of steamers going by the way of the Cape and the Red Sea, *Waghorn* 122–128.

French Steam Vessels. They are superior to the English; great improvements of late years in the engines, and the French engineers have paid great attention to the minutiæ of vessels, *Morgan* 1364–1369—They do not make greater way than the English, *Lardner* 1634.

Fuel. The quantity of fuel might at some seasons of the year, except during the monsoon, be diminished, and the vessel equally immersed by cargo, *Morgan* 1408, 1409——The economy in fuel depends upon the stokers, *Lardner* 1615.——*See* also *Coals.*

Furlough. Expediency of letting the civil and military officers of India return by steam to England for their furlough, instead of going to the Cape of Good Hope; it would be reasonable to leave them the option, *Peacock* 814–820——Defects of the Indian regulations relative to furlough, *Peacock* 831–835——The question of furlough discussed, *Melvill,* 1232–1235, *Mackenzie* 1682–1689.
See also *Officers.* *Steam Navigation to India,* 1.

G.

Gales. Remarks respecting the gales in the Bay of Bengal and Bombay seas, *Brucks* 1836–1843.

Galloway, Alexander. (Analysis of his Evidence.)—A civil and manufacturing engineer; has been six months in Egypt, 856–858——Railroads between Alexandria and Adfa, Cairo and Suez would reduce the distance from Alexandria to Suez to twenty-four or thirty hours, 861, 873–874——There is a railway from the Mokattam Hills for supplying Cairo with stone, 862, 863——Plan for conveying water along the line; length of the proposed line, &c., 864–870——Price of labour in Egypt, 871——There is a great deal of traffic in Egypt, and much more might be created; enumeration of articles the sale of which would be increased by facility of conveyance, 872, 873.

Distance from Cairo to Adfa by the Nile, 875——The Pacha has only one steam-boat on it, but would have more if he met with encouragement, 877——He does not require pecuniary aid from this country, 878——He has no steamer on the Red Sea, but contemplates having two for bringing his own produce, 880.

The Pacha would not object to the passage of troops through Egypt, 881——His character and that of his son and grandson; our communications with India through Egypt very dependent upon the ruling sovereign, 882–884——The Nile at its lowest state

Report, 1837—*continued.*

Galloway, Alexander. (Analysis of his Evidence)—*continued.* state is as navigable as the Thames to Richmond, 885——The plague need not affect the regularity of the intercourse, 886–888——Trade between Alexandria and Europe, 889–891——The Pacha will establish a reasonable rate of custom duties upon goods coming by the Red Sea, he will not charge for traversing the Nile, unless his own vessels are used; nor will he levy port dues, 892, 893.

At Bolack there is one of the first iron foundries in the world, and an abundance of engineers in Egypt, so that a steamer could be repaired at Suez, 899, 904——If there were a railroad from Cairo to Suez, engineers and workmen could be brought over in three or four hours, 906——Mode in which the boilers of the locomotive engines are to be supplied with water, 906–908——A well has been discovered halfway between Cairo and Suez, borings have been made and good water found at the depth of two or three hundred feet, 909–914——Some very superior coal and iron have been discovered in Syria within eighteen miles of the sea, 914–917.

Ganges. There are steam-vessels working on the Ganges, *Head* 1131–1149, 1150. *See* also *Steam Navigation to India,* 2.

Golandos Channel. See *Point de Galle to Socotra.*

Goobet Gollensier. Is sheltered from the north-east monsoon and swell of the sea, by the projecting point affording shelter to vessels lying there at that period, *Wellstead* 436.

Grindley, Captain *Melville.* (Analysis of his Evidence.)—Was in the Company's military service at Bombay for fourteen years; has been returned above twenty years, but has kept up a most extensive correspondence with every part of the British India, 1908–1910——In India the feeling in favour of the comprehensive plan is as strong as possible, and almost universal; no other plan will afford either adequate accommodation or any general degree of satisfaction, 1911–1813——Passengers from Calcutta and Madras would scarcely be benefited at all by the confined communication with Bombay; being for the far greater part females, children, and persons in ill-health; they could not encounter the overland journey to Bombay, 1926——The expense of the Red Sea route would not exceed that of the Cape, either in reference to passengers or commanders, 1914, 1915——The attractions, natural and historical, of the Mediterranean and Red Sea route would induce the majority to prefer it, 1914——A strong argument in favour of the comprehensive plan is, that a very small proportional difference of expenditure will accomplish a much more advantageous result, 1917, 1918——The commercial gentlemen of Bombay contemplate the establishment of a private steamer to Ceylon; another is about to be sent to Calcutta, there are already some in Australia, 1920–1923.

Guardafui, Cape. Desirable to find anchorage for a floating depôt under Cape Guardafui, *Grieve* 1826.

H

Hall's Patent Condensers. See *Condensers,* 2.

Harbours. See *Cossier.* *Socotra,* 1.

Head, Major *Charles Franklin.* (Analysis of his Evidence.)—Has given the subject of steam navigation to India great attention for the last six or seven years; presented a report in [illegible] to the India Board, India House, and to His Majesty, 1081——Examined the proposed route six years ago; it is quite practicable, 1088——Monthly communication can be accomplished during all times of the year, 1090——Socotra and Camaran the best depôts we can have, 1091–1093——Perim is well calculated for a depôt as to position; Aden is better situated for a depot, 1093–1098——Macullah would be useful for a depôt, 1094–1098——The line of continuous communication should begin from England to Alexandria, combine all sources of profit, and be connected with commercial and post-office arrangements, 1100——With the present post-office regulations it will not make an ample return, the cost of conveyance for pamphlets, periodicals, &c., being tantamount to a prohibition, as they can only be sent as letters, and paid by weight, 1100——The Indian community very anxious to have publications, parcels, law papers, &c., transmitted by mail, not in the letter-bags, but by the same conveyance; this transmission would contribute at least 15,900 *l.* a year, 1099–1108.

Number of vessels to be employed, their tonnage and power, 1109——Economy requires that larger vessels than 600 tons should not be used at first, 1115–1117——If larger ones were subsequently requisite, the smaller ones could be easily disposed of; the steam navigation in the Indies would take some of them, 1118–1119——Imaum of Synd has contracted for two steam-boats; the native princes desire to carry the communication as high as Hyderabad; commercial advantages of navigating the Indus by steam, 1120——Steam navigation is rapidly extending, 1122——Communication between Point de Galle, and between the Isle of France and Ceylon, now under consideration, 1121——It is peculiarly adapted for narrow seas, where the trade wind prevails; vessels which are now detained for months would be carried through them in a few days, 1121–1122.

Report, 1837—*continued.*

Head, Major *Charles Franklin.* (Analysis of his Evidence)—*continued.*

Representations have been made from several commercial towns of England, Scotland and Ireland, desiring steam communication with India by the Red Sea, 1124——Parties at all the presidencies in India are prepared to support the measure; there would be no difficulty in accomplishing this object, provided it met with the approbation of Government and the East India Company, 1124——Advantages of Camaran as a depôt; a good smooth harbour, with anchorage at all times; no bar at the entrance; it has a fort and about one hundred families, who trade with Abyssinia, Arabia and Mocha, 1127–1132——A lucrative trade might be drawn there by establishing an European market, 1133——The people all along the shores of the Red Sea are very anxious to possess themselves of various manufactures, 1133.

In 1809 the amount of duties in Massowah was twenty or thirty thousand dollars, 1135——A recent survey of the Red Sea by Captain Moresby, shows that there would be no difficulty in establishing agents there, 1135——Cotton, coffee and indigo are the spontaneous product of the country, 1135——The establishment of a depot at Socotra would bring a great deal of trade into it from the eastern coast of Africa, 1136——The commerce of Egypt would be greatly increased, 1137 1138——Persons going for pleasure would choose the route of Kennah on the Nile to Cosseir, 1138–1139——The sea of Suez, which for two or three months in the year, when the wind blows strong, is more difficult for steamers than the southern part of the Red Sea, would be avoided; but persons desiring dispatch would choose the route of Suez; for packages and parcels Suez would be preferable, 1138–1141——There are several wells in the Desert of Cosseir; they should be deepened and protected; they are boring with success in the Desert of Suez, 1142, 1144.

The Pacha has expressed his desire for the communication, and is anxious to forward it, 1145–1148——Passengers are now treated with civility and kindness, by order of the present Pacha, 1146——Description of the iron boats which would be required upon the Nile for the purpose of carrying on the communication between Cairo and Cosseir, 1149–1150——Steam-boats might also navigate from Alexandria to Rosetta, 1149–1150——Coal has been found in Syria, 1151——Whether it would be desirable to work these mines, since coal may be delivered at Alexandria from this country at a very moderate cost, 1152–1153.

The best description of coal to send across to Suez would be that taken out in ballast by the Liverpool vessels; this mode of supply would also be the most economical, 1152–1155——Price at which Socotra, Camaran and Suez may be supplied with coal; mode of conveyance, 1153–1156——Coals might also be laid down at Mocha, Jidda and the island of Heavandoo, 1157–1161——Mr. Peacock's evidence respecting the cost of coal for the Hugh Lindsey on a voyage between Bombay and Suez, is not correct data for the present day, 1162–1163——The accommodation of passengers, upon the plan of the free-traders, gives general satisfaction; in a Government establishment the object is not so easily accomplished, 1164–1165——On any but the combined plan there would be danger of insufficient returns, 1165——Great moral advantages expected from its connexion with the internal navigation of India by the Ganges and the Jumna, 1166——By having coal at Aden instead of Mocha, 10s. per ton will be saved; expense occasioned by the fixed winds in the Red Sea, 1167–1168——The harbour of Cosseir is safe, 1169——Commercial and political advantages of a general steam communication with the different presidencies of India, 1170——Estimate of the expense of the different communications; first, between England and Bombay; secondly, from England, to include all India, 1172.

[Second Examination.]—Copy of the plan of May 24, 1836, for a comprehensive steam-communication with India, 1175——Erroneous statements in a letter from the Secretary of the Board of Control to the Postmaster-general, 1176——Difference between the plan first submitted to Government by the London committee and that now given in, 1177——The extended communication recommended, 1178——Both plans are equally practicable; the expense of the comprehensive plan is less in proportion to its receipts; miscarriage in the confined plan might lead to total failure, 1179.

[Third Examination.]—Report received from Calcutta respecting Captain Moresby's survey of Heawandee; particulars concerning the same; description and map of Heawandee delivered in, 1927.

Head, Major. Communication from him relative to steam navigation to India, *App. p.* 204–207.

Heavandoo, or *Heawandee Island.* One of the Maldive Islands surveyed by Captain Moresby; might be made a depôt for coals, *Head* 1159–1161——Report sent from Calcutta, stating that this island is capable of receiving a steamer at all times of the year, and of affording safe anchorage, *Head* 1927——Description of Heavandoo Pholo, the Northern Atoll of the Maldive Islands, by Lieut. T. Powell, R. N., assistant surveyor, referred to in the evidence of Major Head, 13 July 1837 (with a map), *App. p.* 217.
See also *Coals,* 1.

Hedjaz. Places in which the holy cities of Mecca and Medina are situated; have not been infected by the plague more than once, *Wellstead* 483–486.

Helena, St. Recommended as a station for steam vessels going the Cape route, ***Peacock*** 512, 513.

Henderson, Captain *Andrew.* (Analysis of his Evidence.)—Has commanded steam and sailing vessels in the Indian seas for 20 years, 918, 919——A steamer would encounter no difficulty in going from the mouth of the Hoogly to Point Palmyras, thence to Madras, and thence to Point de Galle, and it would go at the rate of five or six miles an hour, 920-924——A steamer could make a direct passage from Point de Galle through the Golandos Channel to Socotra, 926-930——The passage round Dondera Head to Bombay has been made several times, 925, 931——Voyage from Calcutta to Canton in the Forbes steamer, towing another vessel, 932-939, 945, 946-951——The monsoons nothing to a powerful steamer, which can ride out a hurricane as well as any other vessel, 940, 941——A powerful steamer could easily make the port of Socotra, 942-944——The piracy of the Indian seas might be easily put down, 947-950——Size of vessels required for steaming between India and Suez, 952-958.

Hobhouse, Sir *John.* (Analysis of his Statement.)—Correspondence and papers showing what has been done since 1834 with respect to steam communication with India, *Ev. p.* 14——Correspondence with various departments of the Government relative to steam navigation to India, *Ev. p.* 17-19——Papers referred to in his evidence, 15 June 1837, *App. p.* 193-201.

Hodeida. An open roadstead; a very indifferent situation for a depôt, ***Wellstead*** 468.

Hoogly to Madras. The course from the Hoogly to Madras should be from the floating light to Point Palmyras, or, in case of strong winds, within the Island of Andaman, *Nairne* 205-210, *Dunn* 256-262——There could be no difficulty in a good European steamer making the passage from Hoogly to Madras and Point de Galle, *Dunn* 256-262——Rate at which the Berenice would perform this voyage of about eighty miles, *Dunn* 262, 263.

Hoogly to Point de Galle. A steamer would encounter no difficulty in going from the mouth of the Hoogly to Point Palmyras, thence to Madras, and thence to Point de Galle; it would go at the rate of five or six miles an hour, *Henderson* 920-924.

Howard, Mr. See *Condensers*, 3.

Hugh Lindsay Steam Vessel. The Directors of the East India Company have sent out orders to the Governor-general of India to place this vessel between Suez and Mocha to carry mails, passengers, &c., *Waghorn*, 1——Description of this vessel; her inferiority to vessels of later date, *Waghorn* 34-40——She passed nine times up and down the Red Sea without impediment from either the winds or currents, *Waghorn* 81. 133——She never carried any cargo, *Waghorn* 132, 133——In consequence of orders given by the Governor-general of India, the Hugh Lindsay has made four voyages to Suez, *Hobhouse, Ev. p.* 14——The Hugh Lindsay experienced great difficulty in getting fuel and other things from the main land during her voyages, *Gardner* 1568.

See also *Coals*, 4.

I.

Imaum of Syud. Has expressed his intention to contract for two steamers, *Head* 1120.

Incrustation. See *Condensers*, 2.

Indian Seas. The navigation of the Indian seas not more difficult than that of the Bay of Biscay, *Dunn* 283-304.——*See* also *Piracy.*

Indian Navy. Number of vessels in the Indian navy, eleven or twelve; annual expense, 100,000*l.*; employed in checking piracy and taking surveys, *Melvill* 1303-1307.

Indigo. France imports indigo exclusively from Calcutta, *Waghorn* 120, 121.

See also ***Massouer.***

Insurance. Insurance by steamers may be effected cheaper, or at the same rate as by sailing vessels, *Briggs* 1445. 1447-1450.——*See* also *Freight and Insurance.*

Invalids. The situation of invalids at Calcutta, who want to go to sea in a south-west monsoon, would be much ameliorated by the establishment of regular steamers, ***Turton*** 1018.

Iron Boats. See *Coals*, 3. *Cosseir to Cairo. Nile River.*

Iron Boilers. See *Boilers. Condensers*, 2.

J.

Jidda. Has hitherto been used as a coal depôt; it is fronted by innumerable coral rocks, and not accessible by night, *Wellstead* 471——Is admirably adapted for a coal depôt; a beautiful harbour; very good anchorage, and very capacious, *Mackenzie* 1665.

See also *Coals*, 1.

Report, 1837—*continued.*

Johnston, Captain. Extract of a letter from Captain Johnston, superintendent of steam vessels in the Ganges, to Lord William Bentinck, dated Calcutta, 3d January 1837; delivered in by the Right hon. Lord William Bentinck, 14th July 1837, *App. p.* 218.

Johnstone, The Right hon. *Alexander.* (Analysis of his Evidence.)—Was sixteen years in Ceylon; offices successively filled, 1886——Was sent officially to England by the government of Ceylon in 1809, to propose various measures for restoring the ancient trade of the island, and improving the condition of the natives; statement of these measures, 1887——They would be forwarded by making Point de Galle a station for steamers, for which purpose it is admirably fitted, 1888——Its advantages, 1889——The deepening of the Pambam channel would probably be effected for the convenience of the Indian steamers, and this would greatly benefit the northern part of Ceylon; that channel was rendered impassable in the fourteenth century; the cause of this explained; it would cost 20,000*l.* to deepen it, 1891. 1892——Cochin might be made a port of great commercial importance, 1893——Sketch of the moral and political advantages the natives of India will derive from a regular and frequent communication with England, 1895——Danger need not be anticipated from the diffusion of knowledge amongst the Indians, 1891——The steam communication should be established with all the presidencies; but if it is to be limited to one of them, Calcutta should be preferred, 1892–1900. 1906——In the event of the communication being confined to Bombay, all passengers except single men would go to Calcutta and Madras by the Cape of Good Hope, to avoid the overland journey from Bombay, 1901, 1902——Steam communication will induce many persons to visit India, and will increase the sale of periodicals, and literary works of that description, 1903–1905.

Jumna. See *Steam Navigation to India,* 2.

K.

Kingston, John. (Analysis of his Evidence.)—One of the engineers to the Admiralty, has been on duty about twelve years, 1690–1693——Hall's condensers keep the boiler clean, spare its wear and tear and save fuel; number of vessels constructed upon that principle; the condensers should be applied to the steam communication with India, 1694–1730——Morgan's paddle-wheels wear out fast, and are too complicated to be used where it would not be easy to get them properly repaired, 1731–1735——Mr. Field's wheel seems to promise great advantages; description of it, 1736–1738——Vessels for the steam service should not exceed six hundred tons, 1741.

They would weather a gale better than larger steamers, and suffer less from wear and tear, 1742–1745——A steamer of six hundred tons should have from two hundred and sixty to two hundred and seventy horse power, 1745——If her form were good, she could use her power without straining herself under the water in making headway, 1746–1748——The forms of the Unicorn and the Eagle recommended; description of the former, 1749, 1750——An excess of power a great advantage, 1751–1753——Steamers of one thousand tons offer no advantages, 1754——Those of six hundred tons would accommodate sixty passengers comfortably; there might not be much room for a cargo, 1755–1758.

L.

Labour in Egypt. Price of labour in Egypt, *Galloway* 871.

Labourers. See *Maltese Labourers.*

Lardner, Dr. *Dionysius.* (Analysis of his Evidence.)—Has been devoted to scientific pursuits for many years, and particularly to those branches connected with steam, 1523–1525——Recommends vessels of one thousand tons burthen and two hundred and fifty horse power, smaller ones being unable to cope with the south-west monsoon, 1526——They should be duplicates: the voyage should be divided into short stages; stages indicated, 1526——Paper delivered in, showing the distance each steamer will have to perform, and the coal and time she will consume, 1526. 1530–1532——Number of steamers required; their size, and locomotive duty, 1532——The proportion of tonnage to power must be determined by the voyage to be performed without a relay of coals, 1533, 1534——No steamer should ever make headway against the south-west monsoon; she should tack and take advantage of the lulls, 1537——Calculation of the relative distances, and rates per hour the same quantity of coal would carry a steamer under the varying circumstances of wind and weather, 1537–1539.

[Second Examination.]—Proportion between the power and tonnage of steamers; their speed would be affected by different proportions, 1540–1546——Reasons for preferring a vessel of one thousand tons and a proportionate horse power to vessels of the size of the Atalanta and Berenice, 1547–1556. 1564. 1565——Estimate of the number of tons which a vessel of one thousand tons, with the proportion of power of one to four, could spare for cargo, 1557——Five hundred and fifty tons would remain for crew, stores, cargo, and about one hundred first class passengers, 1557, 1558——Heavy cargo sinks the vessel

Lardner, Dr. *Dionysius.* (Analysis of his Evidence)—*continued.*

too deep, but for light goods there would be ample room, 1557——The coal-boxes of vessels that have long trips to take should be tanked, and the trim of the vessel maintained by replacing the coals with sea-water, 1557–1561——Estimate of the comparative annual expense of two steam-ships of different tonnage, 1562.

Fitness of the harbours of the Red Sea for steamers; the Island of Camaran recommended as the intermediate station between Socotra and Suez; there is no bar at the entrance, 1566–1568.

The Hugh Lindsay experienced great difficulty in getting fuel and other things from the main land, 1568——Advantages of Camaran as a station, 1568——Hulks furnished with fuel, &c. should be placed at Socotra, to prevent disturbance and delay; there are two sheltered harbours at Socotra, 1568——The present number of passengers that pass between England and India is three thousand two hundred a year, 1569——That number will be greatly augmented by the establishment of steam communication, 1569——In all cases where railroads have been established, the intercourse has increased in an immense proportion, 1569——Since steam-boats have been established with the Peninsula, more than ten times the number of persons go abroad, 1571——The Boulogne steamers land one thousand persons a day there, in consequence of the reduced fares, 1573——The fare of the Red Sea route may be reduced, without deduction from the profits, 1574——The subject of fares discussed, and a table of fares for the stages drawn up, 1575–1580——Comparative amount of correspondence and mercantile intercourse between the different presidencies and this country, 1581–1583.

Commercial intercourse will be enlarged, 1584——Remarks on the transfer of cargo from one steamer to another, in reference to insurance, 1585——General information respecting the machinery to be used in steamers destined for long voyages; makers recommended, 1587——The process of incrustation in boilers explained, 1587——The water of the Red Sea not likely to produce more deposit than that of any other sea; fresh water has more lime, and that is the most mischievous ingredient of the deposit, 1588–1590——Ordinary remedies applied to this evil, 1591——The structure and efficiency of Hall's condensers considered, 1591–1593. 1597–1604——Difference of opinion respecting them, 1594——Recommended for the service on this side of Egypt, because always within reach of repairs, 1594——Difference between Howard's principle and Hall's explained; Howard's has not attained to that point of certainty which would warrant its adoption, 1605–1607——The subject of coal discussed in reference to price, quality and mode of conveyance to Suez, 1608–1615——A constant change of vessel in hot climates advisable, both for the vessels and the engineers, 1616.

Witness gives in a paper, showing the cost of a steam-ship and its annual expense; annual cost between India and Suez, exclusive of stations; the whole time between London and Calcutta, 1616——Considerations which influence witness in allowing an unusual complement of mechanical skill, 1616——The economy of fuel depends upon the stokers, 1616——Reasons why the captain should be conversant with the details of the engine, 1616——Observations upon boilers, float-gauges and other apparatus, 1617–1619——Copper boilers far preferable to iron; they are double the expense, but last longer; if Hall's condensers are used, iron boilers will do, 1620, 1621——The subject of explosion considered, 1623, 1624——Opinion respecting the different kinds of paddle-wheels; Mr. William Morgan's are on an improved plan, but too costly, [illegible] tested on the Asiatic side of Egypt, 1625——The split paddle is more efficient than the common paddle, and very simple, 1625——The Medea has Morgan's paddles; it is not advisable to unship the paddles; temporary adjustment, alterable at pleasure at sea, is incompatible with the stability and strength required, 1625–1628.

It would not be expedient to connect the present establishment of Mediterranean packets with the Indian station, 1529——Passengers and despatches arriving at Alexandria from Suez would frequently, in crossing over to Malta, be detained there a month, waiting for the Malta steamer, 1629, 1630——It is essential to the success of the steam enterprise, considering it as a passenger line, that quarantine should be performed at Falmouth rather than at Malta; present rules of quarantine, 1631, 1632——Size of steamers to work between Alexandria and Falmouth; six or seven hundred tons sufficiently large, 1633——French steamers do not make greater way than the English, 1634——If efficient steamers are established between Alexandria and Falmouth, the correspondence from England to India need not go by Marseilles, 1635——The mails would not save time by that arrangement, 1636.

Leave of Absence. See *Furlough.*

Letters. Return of the number and amount of letters landed at the ports in Ireland from the presidencies in India, viz, Madras, Bombay, Calcutta and Ceylon, for one year, 5th January 1837, *App. p.* 198.——*See* also *Suez to Bombay.*

Letters and Newspapers. Return of the number and amount of letters and newspapers received by private ships from the island of Ceylon and the three presidencies of Bombay, Madras and Calcutta, in three years ending 5th October 1834–1836, *App. p.* 197——Similar return of the number and amount of letters and newspapers sent by private ships to the same places, *App. p.* 197.

Lichfield, Earl of. Letter from W. L. Maberly, esquire, to the Earl of Lichfield, dated 3d February 1837, on the proposition from the Company associated to promote steam navigation to India, *App. p.* 194–196.

Liverpool Vessels. See *Coals*, 2.

Lime. Fresh water has more lime than salt water; lime is the most mischievous ingredient of the deposit in the boilers, *Lardner* 1588–1590.

Lodhiana. A steam-boat might communicate with Lodhiana, by an eighteen days' passage, from Bombay, *Hobhouse*, *Ev. p.* 22.

M.

Machinery. General information respecting the machinery to be used in steamers intended for long voyages, *Lardner* 1587. *See* also *Monsoons. Steam Vessels.*

Mackenzie, Captain. (Analysis of his Evidence.)—Of the Bengal cavalry; left India in December 1835, and came in a native vessel from Calcutta up the Red Sea through Egypt at the season of the north-east monsoon, 1636–1640——Touched at Cochin, Mocha, Jidda, Cosseir, and crossed the Desert of Thebes, 1646——Found water in the wells there, 1648, 1649——Thought the route easy and interesting, and met with other travellers of the same opinion, 1654, 1655——Conversed with several English and Americans travelling for pleasure, who would have no hesitation in going to see India if steam communication were established, 1657——Of the twenty-five officers who came overland with witness, twenty went to Sicily, and the rest to England direct by the Falmouth packet, 1658——Witness found the voyage by the Red Sea less expensive than round by the Cape; particulars respecting it, 1659–1664——Jidda is admirably adapted for a coal depôt; Mocha not so good; general opinion is in favour of Camaran, but witness did not stop there, 1665–1667——The Pacha is as anxious as the English for the steam communication; his reasons for being so, 1668——The merchants witness saw there were equally so; they think that it will greatly increase their trade with India, 1669, 1670——It may also be the channel of the Turkey trade to India and China, 1669.

Articles specified that would eventually pass that way, 1670——Extent of the Pacha's dominions; his officers, both civil and military, highly favourable to the English, and most courteous to British travellers, 1671——Mode in which the Pacha removes his troops from the Nile to the Red Sea, 1673, 1674——The water of the Desert is good enough for culinary purposes, 1675——Observations respecting the plague, 1676–1678——General desire of the civil and military officers of Bengal for steam communication, 1679, 1680, 1682——Whether the rates charged by the Cape of Good Hope and the Mediterranean for passengers should be raised or lowered, 1681——It would be good policy to give the same privileges to Indian officers coming to England, with regard to retaining their appointments and allowances, as they at present possess going by Egypt or the Cape of Good Hope, 1682–1689.

Macullah. Would be an admirable depôt during the north-east, but could not be approached during the south-west monsoon, *Wellstead* 423, 424——It would be useful as a depôt, *Head* 1094–1098.

Madras. Should be a depôt for coals, *Barber* 1061, 1062.
See also *Dauk. Despatches. Letters and Newspapers. Hoogly to Madras. Passengers*, 3. *Point Palmyras.*

Madras to Bombay. The inhabitants of Madras and the civil and military officers of India are very anxious for a steam communication with Bombay, *Sim* 1222–1238——The land route is very inconvenient and expensive, and almost impassable by ladies, *Sim* 1222–1238.

Madras and Calcutta. See *Plan for effecting a Steam Communication with the three Presidencies of India.*

Madras to Point de Galle. In the voyage from Madras to Point de Galle a powerful steamer could make head against the south-west monsoon, *Nairne* 216–218.
See also *Monsoons. Trincomalee.*

Madras Roads. The land and sea breezes prevail all along the coast, but do not extend far out to sea during the south-west monsoon, *Nairne* 212–215.

Mahmoudia Canal. All passengers and goods go by this canal to and from Cairo, and thence by Suez or Cosseir to the Red Sea, *Briggs* 1442.

Mails. See *Piracy.*

Malta Packets. See *Postage. Quarantine.*

Maltese Labourers. Great number of Maltese labourers and artisans have for years been settled at Alexandria and Cairo, *Briggs* 1441.

Report, 1837—*continued.*

Manar. See *Adam's Bridge.*

Marseilles. Merchants in Marseilles can receive valuable articles from Bombay in thirty days by Mocha through Egypt, *Waghorn* 115——Lord Palmerston concurred in the expediency of transmitting the Indian mails through France to Marseilles to save time, *Hobhouse, Ev. p.* 21.

Marseilles and Alexandria. The route by Marseilles is the quickest, cheapest and the best that can be devised for the transmission of India letters, &c., *Waghorn* 1——The steamers carrying the goods from Marseilles to Egypt realize an immense income; expediency of establishing steamers of our own between Marseilles and Alexandria, *Waghorn* 119——Steam packets go from Alexandria to Marseilles every ten days; the distance from India to Marseilles direct is one thousand miles less than by Gibraltar, *Peacock* 841–844.

Massouer. Amount of the duties received in 1809 at Massouer, as stated by Mr. Salt; recent survey of the Red Sea by Captain Moresby shows that there would be no difficulty in establishing agents there, *Head* 1135——Cotton, coffee and indigo are the spontaneous product of the country, *Head* 1135.

Mecca. See *Hedjekz. Plague.*

Medea, H. M. Frigate. Is a very good sailing ship: her stucture, &c.; capacity for fuel, *Oliver* 1783–1794—— Her equipment as a vessel of war amounts to an immense weight, *Oliver* 1796, 1797——The Medea described; considered by witness a perfect vessel, *Turton* 971.——*See* also *Steam Vessels,* 1.

Medical Students. If a steam communication with India is opened, medical students from the college in Calcutta would come over to England to study, *Turton* 1012.

Medina. See *Hedjekz.*

Mediterranean Packets. They will not form a sufficiently continuous chain for steam communication to England, *Barber* 1075—— They were built twelve years ago, when steam navigation was in its infancy; this will account for their insufficiency; new ones have been lately employed, *Morgan* 1370–1374—— It would not be expedient to connect the present establishment of Mediterranean packets with the Indian one, *Lardner* 1529——Sir John Barrow's estimate of the expense, exclusive of repairs, of one steam vessel therein, *Hobhouse, Ev. p.* 20.

Melvill, James Cosmo. (Analysis of his Evidence.)—There is not sufficient depth of water in the inner harbour of Mocha for steamers of the burthen of the Atalanta and Berenice when fully laden, 1239——This difficulty may probably be overcome; if not, Perim can be substituted, 1239——Coal could be transported from Mocha to Aden, which might be made the station, 1240——The monthly conveyance of letters from India may, even now, be expected, but more steamers are requisite to insure it; in the meanwhile sailing vessels will, to a great extent, supply the deficiency, 1241–1245——The conveyance of public despatches would be accelerated by sending them through France to Marseilles, instead of direct from England by the Malta packets, 1246, 1247——Passengers as well as letters will go to India by the steamers; an arrangement profitable to the Company, and convenient to all parties, 1248–1251——Arguments against the tripartite scheme, 1252–1258——Number of steamers required for communication with Bombay and Calcutta, 1259–1262——The practicability of steaming against the south-west monsoon from Bombay is still a matter of opinion, 1263–1265.

Estimate of the expense of communication with Bombay, 1268–1279——It is highly probable that the profits derived from the extended communication would be adequate to its expense, 1280–1286——Amount of additional earnings requisite to secure it the preference in a pecuniary point of view, 1287——A large steamer could take one hundred or one hundred and fifty tons of general cargo, besides passengers, and thus realize ample returns, 1288–1290——Remarks on the trade of the Arabian Gulf with India, 1291–1296——Risk and legal liabilities incurred by transhipping cargo, 1297–1302——Number of vessels in the Indian navy, eleven or twelve; annual expense 100,000*l.*, 1303–1305——Employed in checking piracy and taking surveys, 1306, 1307——The service against pirates should not be performed by vessels conveying the Bombay mails; piracy would be better opposed by steamers, 1309–1311——The Indian Government is anxious to increase the number of steamers in Bengal; at present they have but three for general service, 1312–1316—— If the communication were restricted to Bombay, passengers, including women and children, could go dauk to Calcutta without difficulty; occasional impediments would arise, especially from heavy rain, 1317–1325——Political, commercial and social advantages arising out of regular and rapid communication with India, 1326–1331——The question of furlough discussed, 1332–1335.

Merchants. See *Commerce. Marseilles.*

Military. Mode in which the Pacha of Egypt removes his troops from the Nile to the Red Sea, *Mackenzie* 1673, 1674——Description of steam vessels best adapted for the quick conveyance of troops; the very largest class recommended, *Oliver* 1772–1782.

Report, 1837—*continued.*

Mocha. Should be the grand depôt for fuel between all India and Suez, *Waghorn* 1, *Ev. p.* 2.——Will not answer for a coal depôt, *Peacock* 571, *Turton* 989, 990——Recommended as a place for repairing the machinery of steam vessels, *Waghorn* 51, 52——There is an abundance of water for the use of the steam vessels, but it is not very good, *Waghorn* 102, 103——Cannot be made available as a station for steamers; it is an open roadstead, and during nine months of the year very little communication can be had with the shore, in consequence of the southerly winds, *Wellstead* 445, *Mackenzie* 1664, 1665——No vessel drawing more than ten and a half feet of water can go into the inner anchorage there, *Peacock,* 571, *Melvill* 1239——There is not sufficient depth of water in the inner harbour of Mocha for steamers of the burthen of the Atalanta and Berenice, when fully laden, *Melvill* 1239——Is an open roadstead, where the south-east monsoon blows with constant violence; the anchorage is comparatively safe, as it seldom blows in squalls or hurricanes, *Mackenzie* 1664, 1665.

See also *Coals,* 1. *Cosseir and Mocha. Duties. Opium.*

Mocha to Bombay. No steam vessels should attempt the passage direct from Bombay to Mocha from the 15th May to the 15th September, *Waghorn* 1, *Ev. p.* 2——Interruptions have occurred between Mocha and Bombay; none between Mocha and Calcutta, *Waghorn* 190.——*See* also *Atalanta Steam Vessel.*

Mocha to Calcutta. Three steamers should go between Mocha and Calcutta, touching either way at Socotra for fuel, when necessary, and anchoring at Trincomalee and Madras a certain number of hours, &c., *Waghorn* 1, *Ev. p.* 2.

Mocha to India. Six more steamers, each of eight hundred and fifty tons burthen, are required to perfect the communication from Mocha to all India, *Waghorn* 1, *Ev. p.* 2——Observations on the tracks which should be followed by steamers navigating between Mocha and the continent of India during the north-east and south-west monsoons, *Waghorn* 1, *Ev. p.* 3.

Mocha to Socotra. Voyage from Mocha to Socotra takes three or four days, *Waghorn* 104.

Mocha to Suez. Proposition for two steam vessels to ply constantly between Suez and Mocha; they should be of the same size, and about five hundred and fifty tons burthen, *Waghorn* 1, *Ev. p.* 2——The distance between Mocha and Suez is one thousand and forty miles, *Waghorn* 6——There is no difficulty in steam navigation between Mocha and Suez, *Waghorn* 8, 9——Relative length of passage from Suez to Mocha, and from Mocha to Suez, *Waghorn* 20–22——A good steamer only five days going from Suez to Mocha, *Waghorn* 40——The voyage from Mocha to Suez can be made every fifteen days, by having three steamers at work, *Waghorn* 44, 45——Width and safety of the channel, including the Straits of Juba, *Waghorn* 26–33.——*See* also *Hugh Lindsay Steam Vessel.*

Mokattam Hills. There is a railway from the Mokattam Hills for supplying Cairo with stone, *Galloway* 862, 863.

MONSOONS:

1. *Generally.*
2. *North East.*
3. *South West.*

1. *Generally:*

A steamer would go four or five miles an hour against the strongest monsoon, without danger to the machinery, *Nairne* 221–223——By making traverses the vessel might be much eased, and this should be done for a day or two at the spring tides, *Nairne* 238–244——The monsoon gales blow home most furiously, but do not last more than thirty-eight or forty hours; the barometer acts invariably during these periodical storms, *Dunn* 264–266——A vessel overtaken by a monsoon between Madras and Point de Galle must make an offing of one hundred miles, and lie-to, *Dunn* 268–270——The monsoons make but three or four days' difference between Suez and any port in India, *Turton* 1008——Both in the north-east and south-west monsoon one of the passages could be made under sail, *Barber* 1072, 1073——They are nothing to a powerful steam vessel, which can ride out a hurricane as well as any other vessel, *Henderson* 940, 941——The navigation of the Indian seas by steamers offers no difficulty, even during the monsoons, that cannot be easily surmounted, *Lord W. Bentinck* 1950.——*See* also *Aden.*

2. *North East:*

Is not so strong as the south-east monsoon, *Dunn* 272–274——A steamer would go six or seven miles an hour against it, *Dunn* 273——A very powerful steamer would run two hundred miles in the Bay of Bengal against the north-east monsoon, *Peacock* 665–670.——*See* also *Bengal,* Bay of. *Goobel. Gollensier.*

3. *South West:*

South-west monsoon is strong, and blows for a week together, *Waghorn* 18——The strength of the current and power of the south-west monsoon extend to the distance of one hundred or one hundred and fifty miles from the Bassas, *Dunn* 305, 306——

A powerful

MONSOONS:—**3.** *South West*—continued.

A powerful steamer would make way against them at the rate of five miles an hour, *Dunn* 305, 306——In the full and change of the moon the south-west monsoon is very squally, *Dunn* 351, 352——Too much importance is attached to the south-west monsoon; a large steamer would find no difficulty in going from Bombay to Socotra against it, *Wellstead* 400–409——Course to be pursued; periods to be observed, *Wellstead* 400–406——Extent of the south-west monsoon; during its prevalence coals cannot be obtained from the Arabian coast, *Wellstead* 428–431——Effect of the south-west monsoon on the navigation of the Bay of Bengal, *Peacock* 662, 663——The practicability of steaming against the south-west monsoon is still a matter of opinion, *Melvill* 1263–1265——No steamer should ever make headway against the south-west monsoon; she should tack and take advantage of the lulls, just like a sailing vessel, *Lardner* 1537.

See *Cochin. Dundra Head. Macullah. Madras to Point de Galle. Mocha and India. Point de Galle.*

Morgan, William. (Analysis of his Evidence.)—An engineer; has made steam power and steam machinery his exclusive study; the subjects of tonnage, power, boilers, form, machinery, building and cost, discussed with reference to steamers for communication with India, 1336–1351——Communication with all the presidencies more practicable than with Bombay only, 1352——Remarks upon the passage between Bombay and Socotra, in reference to the size of vessels best fitted for it, 1353——It is easier to go from Galle to Socotra, than from Bombay to Socotra; reasons given, 1354, 1355——Remarks upon the quantity of coal a steamer of six hundred and fifty tons ought to take; what run it would enable her to effect, and at what rate per day and hour, 1356–1361——Opinion of the Berenice, 1362, 1363——French steamers superior to English; reasons given, 1364–1369——The Mediterranean packets were built twelve years ago, when steam navigation was in its infancy, and this will account for their inefficiency; some new ones have been lately employed; their speed, 1372–1374——A steamer taking coals for two thousand two hundred miles will not accomplish the passage, by headway, between Bombay and Socotra, with the weather against her, but will be obliged to make southings, 1377, 1378——An effective steamer is a non-effective sailer, 1379——The Medea not an exception, 1380.

Twelve vessels required for the entire line between Falmouth and the three presidencies; the communication could not be efficiently kept up with a smaller establishment, 1381–1387——Four steamers and a spare one would be sufficient to communicate with Calcutta, Madras and Ceylon from Socotra, 1388, 1389——They should be duplicates, both in size and machinery; convenience and advantages of this arrangement, 1390——Witness furnished Major Head and the gentlemen of the Provisional Committee with particulars respecting the probable expense of a general communication with India 1391, 1392——The shortest possible stations recommended, not only for the relief of the vessel and the men, but because long stations occasion a deposit of salt in the boiler, and other accidents to the machinery, by which the consumption of coal is exceedingly increased, 1393–1395——The expense of various stations would be more than counterbalanced by the diminished wear and tear of the vessels, 1396.

Vessels of six hundred and fifty tons will take seventy passengers, but no general cargo, without great diminution of speed; the twenty spare tons are for parcels and things of value, which are small and light, 1398–1402——A larger vessel would have but little comparative space if her power were made equal to her size, 1403, 1404——Her speed will diminish in proportion to her cargo, 1405–1407——The quantity of fuel might at some seasons of the year, except during the monsoons, be diminished, and the vessel equally immersed by cargo, 1408, 1409——None of the late plans for curtailment of space in steamers have yet undergone the test of experience, 1410–1412——Collyer's boilers, 1413–1416——Hall's patent condensers are absolutely necessary for Indian steamers; objections to them answered; they have been under experiment for two years, and have not once failed, 1418–1424——Iron boilers can be used with them, because they entirely prevent incrustation; they also render Welsh coal more valuable, 1425, 1426, 1428, 1429——Contrivance by which Hall's condensers obviate the liability to incrustation, 1430——Injurious effects of the saline deposit, especially in the Red Sea, the waters of which are strongly impregnated with it, 1427.

Morgan, Mr. Additional answer to Question 1353, in his Evidence, 4 July 1837, *App. p.* 202.

Morgan's Paddle-wheels. See *Paddle-wheels.*

N.

Nairne, Captain *Alexander.* (Analysis of his Evidence.)—Commanded the General Kidd in the East India Company's service eight voyages, 195–198——No difficulty in a steamer making a passage up and down the Bay of Bengal in all monsoons; power of steamers, as evinced by the Attwood from Rotterdam, and the Clarence and Monarch from Leith, 199–204——The course from the Hoogly to Madras should be from the

Nairne, Captain *Alexander.* (Analysis of his Evidence)—*continued.*
floating light to Point Palmyras; or in case of strong winds, within the Island of Andamans, 205-210——No difficulty in going down the coast from Point Palmyras to Madras, 211——The land and sea breezes prevail all along the coast, but do not extend far out to sea during the south-west monsoon, 212-215.

In the voyage from Madras to Point de Galle a powerful steamer could make head against the south-west monsoon, 216-218——A passage might be made direct from Bombay to Socotra during the south-west monsoon, which is violent only within thirty or forty leagues of the coast of Bombay, 219, 220——A steamer would go four or five miles an hour against the strongest monsoon, without danger to the machinery, 221-223——The distance is upwards of twelve hundred miles; in case of the wind being very strong, a course to the eastward of south should be taken, 224-227——It would not be necessary to go so far south as Goa; the wind never blows hard more than three days in the full and change, 228, 229——From what witness observed in his passage from Leith to London in the Clarence, he should apprehend no danger to the machinery, 230-237——By making traverses the vessel might be much eased; and this should be done for a day or two at the spring tides, 238-244——There is a strong current round the Point de Galle, which might make it difficult at times for steamers to round the point, 245-248——In the passage from Ceylon to the mainland a steamer might pass between the Bassas and the island, 249, 250.

Natives of India. The morals and domestic happiness of the natives endangered by increased contact with Europeans, *Peacock* 777-781——Considerations respecting the remedy for this evil; the law at present in force for their protection against settlers not efficient; it meets with opposition from the European community, *Peacock* 782-78——Defects of the law of the Company; the natives know nothing of the English law, and the language they use is totally unknown to the European population, *Peacock* 767-791. 795, 796——The natives of India would gladly avail themselves of an English education, especially if classes were made for them in the University of London or elsewhere, *Turton* 998-1001——The rapidity of steam intercourse may induce the natives of India to come over to England for scientific purposes; they have hitherto objected to the sea, *Peacock* 810-813.

Steam communication is the only means of drawing the natives over to England, and making their assistance useful to us and to their own country, *Turton* 998-1001——The more intercourse the Indians have with Europeans the juster will their notions become on the policy as well as propriety of good faith and honesty, *Turton* 1012——Danger need not be anticipated from the diffusion of knowledge amongst the Indians, *Johnstone* 1891——No evil consequences apprehended from the influx of natives of India into England, *Elphinstone* 1933.

Newspapers. See *Periodicals.*

Nile, River. The Pacha of Egypt has only one steam-boat on it, but would have more if he met with encouragement, *Galloway* 877——The Nile, at its lowest state, is as navigable as the Thames to Richmond, *Galloway* 885——The water of the Nile is very sweet and will keep a long time, *Mackenzie* 1675.——*See* also *Cosseir to Cairo.*

O.

Officers in India. Indian officers are very anxious for the establishment of a steam communication with India, *Barber* 1038, 1039, *Sim* 1222-1238——General desire of the civil and military officers of Bengal for steam communication, *Mackenzie* 1679, 1680. 1682——It would be good policy to give the same privileges to Indian officers coming to England, with regard to retaining their appointments and allowances, as they at present possess going by Egypt or the Cape of Good Hope, *Mackenzie* 1682-1689.
See also *Furlough.*

Oliver, Captain *Robert,* R. N. (Analysis of his Evidence.)—Has been commander and captain nearly ten years; during the last six has commanded the Dee and the Phœnix steamers, and been interested in other vessels, 1759-1762——Power and tonnage of the same, 1763——The proportion of tonnage to power depends upon the purposes for which a vessel is employed, 1764, 1765——Witness's experience leads him to agree with Dr. Lardner respecting the tonnage and power of steamers for the Indian service, 1766-1771, 1798, 1799——Description of steamers best adapted for the quick conveyance of troops; the very largest class recommended, 1772-1782——The Medea steamer a good sailing ship, 1783, 1784——Her structure, masting, rigging and capacity for fuel, &c., 1785-1793——Her equipment as a vessel of war amounts to an immense weight, 1796, 1797——Diagram delivered in, showing the maximum distance yet made under steam at one time without a stop, 1783-1799——Further observations respecting paddles, 1800-1803——Hall's condensers seem to promise well, 1804-1815——Qualities of the different sorts of coal, 1816-1820.

Opium. Very little used at Mocha; Turkish opium will be sent in the steamers to India *Waghorn* 114.

Overland Mails. Time occupied in forwarding despatches from London to Bombay and Calcutta respectively, as stated in a despatch, September 1836, *Hobhouse, Ev. p.* 15.
See also *Bombay. Despatches.*

P.

Pacha of Egypt. The Pacha of Egypt would give every facility for the establishment of an intercourse with India through his territories, his interest to do so, *Waghorn* 55-58, *Peacock* 805-809, *Head* 1146, 1147, *Mackenzie* 1668——No reason to apprehend the exaction of a tribute, *Waghorn* 59—— He wishes to have steam communication established; he would allow English troops to pass, and do anything in his power to facilitate the proposed intercourse, *Peacock* 805-809, *Galloway* 881—— His character is that of his son, *Galloway* 882——He does not require pecuniary aid from this country, *Galloway* 878——Will establish a reasonable rate of custom duties upon goods coming by the Red Sea, *Galloway* 892——He will not charge for traversing the Nile unless his own vessels are used, nor will he levy port dues, *Galloway* 896——Has expressed himself much interested in the question of steam communication with India, *Head* 1146—— He has offered to establish a railroad with the view of facilitating it, *Head* 1147——He is disposed to make carriage roads to facilitate the communication between Alexandria and the Red Sea, *Briggs* 1442——Affords protection to trade and travellers wherever his power extends, but to insure his co-operation it would be requisite to negotiate with him; he may consent to a modification of the custom duty, *Briggs* 1435-1451—— Would be good policy in him to encourage Indian and Maltese settlers in Egypt, *Briggs* 1441——Is very anxious for a steam communication being opened with India by the Red Sea, *Mackenzie* 1668——Extent of his dominions; officers, both civil and military, highly favourable to the English, and most courteous to British travellers, *Mackenzie* 1671.——*See* also *Military. Nile River.*

Packet Boats. See *Steam Vessels.*

Packet Service. Table showing the organization of the packet service, the postage of letters so transmitted, and the rate of postage, *App. p.* 200.

Packing Goods. Mode of packing goods by which the plague and other infection might be entirely excluded from the packages, provided they passed unopened through Egypt, *Briggs* 1439.

Paddle-wheels. Opinion respecting the different kinds of paddle-wheels in use, *Lardner* 1625, *Kingston* 1731-1735, *Oliver* 1800-1810——The split paddle-wheels are more efficient than the common one, and very simple; it would be advisable to adopt them, *Lardner* 1625——It is not advisable to unship the paddles; temporary adjustment, alterable at pleasure at sea, is incompatible with the stability and strength required, *Lardner* 1625-1628, *Oliver* 1800-1803.
Field's wheel seems to promise great advantage; description of it, *Kingston* 1736-1738, *Oliver* 1810.
Morgan's paddle-wheels wear out fast, and are too complicated to be used where it would not be easy to get them properly repaired, *Lardner* 1625, *Kingston* 1731-1735, *Oliver* 1808-1811.

Palmerston, Lord. See *Marseilles.*

PASSENGERS:

1. *Generally.*
2. *Rate of Charges to be made.*
3. *Increase or Decrease in their Numbers.*

1. *Generally:*

No steam communication with India would answer, except combined with carrying passengers, *Waghorn* 177——The accommodation of passengers upon the plan of the free traders gives general satisfaction, but in Government establishments the object is not so easily accomplished, *Head* 1164, 1165——Passengers as well as letters will go to India by the steamers; an arrangement profitable to the Company and convenient to all parties, *Melvill* 1248-1251.

2. *Rate of Charges to be made:*

Charge which should be made to passengers; the East India Company derive little or no profit from passengers, *Peacock* 712-719——That no returns could be procured from passengers, as stated by Mr. Peacock, is an entirely erroneous opinion; examination of the error, *Turton* 1004——Whether the rates charged by the Cape of Good Hope and the Mediterranean for passengers should be raised or lowered, *Mackenzie* 1681——The fares of the Red Sea route may be reduced, without deduction from the profits, *Lardner* 1574——Table of fares to be charged for the different stages, *Lardner* 1575-1580.

PASSENGERS—continued.

3. *Probable Increase or Decrease in their Numbers:*

Estimate of the number of passengers between Bombay and the eastern side of India, and the presidencies of India, *Peacock* 739–748——The present number of passengers that pass between England and India is three thousand two hundred annually, *Lardner* 1568——The number will be greatly increased by the establishment of steam communication, *Lardner* 1569——Since steam vessels have been established with the Peninsula more than ten times the number of persons go abroad, *Lardner* 1571——Speedy, regular and convenient communication with India by steam will induce great numbers of Europeans to go there, *Peacock* 769–776, *Barber* 1075, *Johnstone* 1903–1905——A boat should come either to Falmouth or London; this would increase the number of passengers, avoid the quarantine at Malta, and give greater security to valuable property, *Barber* 1075——It would induce many persons to go out to India and to Egypt; children would be sent by the Red Sea from India, *Barber* 1075——Estimate of the outlay for passengers during a voyage to India, *Barber* 1074——Those from Calcutta and Madras would scarcely be benefited at all by the confined communication with Bombay, *Grindlay* 1926.

See also *Egypt. Plan for effecting Steam Communication with the three Presidencies of India. Steam Vessels,* 4.

Paumbam. The passage of Paumbam between the Island of Ramisseran and the coast of Coromandel is practicable to a certain extent, *Sim* 1183——Impediments to be removed before a channel of twelve or fourteen feet at high water could be obtained; current strong; the expense would be considerable, *Sim* 1184. 1191. 1206, 1207. 1220, 1221. 1229–1236——This channel was rendered impassable in the fourteenth century; the cause explained; it would take 20,000 *l.* to deepen it, *Johnstone* 1891–1894——Copy of the survey and report on the Paumbam passage between Ceylon and the main land of India, made in 1829, by Major Sim of the Madras Engineers, *App. p.* 207–215.

Paussielgue, Mons. Comptroller of the French army during its occupation of Egypt in 1799; remarks by him, in his intercepted letters, that by seizing Egypt, France would annihilate the East India trade, &c., *Head* 1137.

Peacock, Thomas Love. (Analysis of his Evidence.)—Examiner of India Correspondence; was examined in 1832 and 1834, 494–496——Number and size of vessels required for effecting the communication with Bombay, 497–501. 539, 540——Advantages of changing the vessels in the Red Sea; reason why their tonnage and power should be the same, 502–507——Description of the Atalanta and the Berenice; their average consumption of coal and their average run; the coal was sent direct from Llangennech in large pieces, 508–510. 527–538——Stations chosen, 510–517——St. Helena recommended as a station for steamers going the Cape route, 512, 513——The run of the Berenice; her consumption of coal; why less than that of other vessels, 518–524. 537, 538——Two more steamers requisite between Point de Galle and Calcutta, 541–543.

Annual expense of each vessel, 544–552. 583–596——The only Indian coal available for navigation is the Burdwan; charge for its freight, 553–559——Evidence respecting the price and consumption of coals; Camaran will serve as a coal depôt; Mocha will not answer that purpose, 560. 572, 573——The larger the vessel the more work she will do, without consuming more coal than a smaller one; her wear and tear will be less, 574–582——Remarks upon ship-building, machinery and equipment, with reference to expenditure, 584–596——Evidence respecting copper and iron boilers, 597–611——Considerations of the fitness of Socotra as a depôt, 612–616——The best depôt between Suez and India is the Island of Perim; Socotra, even if good, could be dispensed with; it might be more advisable to use it as a depôt than to advance further to Perim or to Camaran, for though long runs save time, they overwork the vessel, 617–633——The question of time considered in reference to course, distance, winds and currents, 635–656.

There is greater facility for steaming in the Bay of Bengal than in the Arabian Sea, 659——Remarks upon the winds near the African coast, 661——Effects of the south-west monsoon on the navigation of the Bay of Bengal, 662, 663——Under favourable circumstances, a well-adapted steamer could make the passage from Calcutta to Point de Galle in six or seven days: her average run would be one hundred and fifty miles a day; a very powerful steamer would run two hundred miles in the Bay of Bengal against the north-east monsoon, 665–670——To save the time occupied in taking in coals, it would be better to have another vessel ready: Point de Galle the best station for taking in coals during the south-east monsoon, 671–675——Comparative estimate of the length of the passages from station to station, and of the time occupied in making them, 676–695——The subject of the transmission of letters considered, 696–710——Charge which should be made to passengers; the East India Company derive little or no profit from passengers; the charge from Calcutta to Suez should be higher than from Calcutta to England by a sailing vessel, because the expense of sending a steamer to Suez is far greater, 712–729.

Calculation of the time it would take the Atalanta or the Berenice to proceed from Socotra to Suez during the south-west or north-east monsoon; on returning, the north wind blows so much in the Red Sea that a steamer might almost sail down; part of the present

Peacock, Thomas Love. (Analysis of his Evidence)—*continued.*
present plan is to send sailing vessels when steamers are unavailable, 730–738. 676–695 ——Estimate of the number of passengers between Bombay and the eastern side of India in the course of a year, and between the presidencies in India, 739–748—— Post-office receipts; there will be a heavy charge for letters by steamers; present arrangements between the Government and the Company relative to the postage of letters; the high rate of postage from Bombay to Calcutta would diminish the number of letters by steam; reason why they would go much cheaper by dauk, 749–761——But little space for profitable freight in the Red Sea steamers, there would only be room for treasure, which is usually considered the perquisite of the captains; steamers that run a long distance can carry nothing but fuel and small articles, 762–764——Calculation respecting the space the Atalanta or Berenice might have for cargo; a cargo from India during the south-west monsoon is out of the question; as much coal as possible should be taken, 765, 766.

Political and commercial consequences likely to ensue from bringing England and India so much closer together, 767——Commercial men doubt the importance of rapid communication; they do not want the bills to anticipate the goods, 768——Speedy, regular and convenient communication with India by steam will induce great numbers of Europeans to go there, 769–776——The morals and domestic happiness of the natives endangered by increased contact with Europeans, 777–781——Considerations respecting the remedy for this evil; the law at present in force for their protection against settlers not efficient, though made under the authority of the British Parliament, 782–784—— Defects of the law of the Company; the natives know nothing of the English law, and the language they use is totally unknown to the European population, 767–791. 795–796 ——The average passage from Falmouth to Suez is twenty-three days, 792–794——It would take sixteen days to go dauk from Calcutta to Bombay, and forty-nine to reach England by steam, making sixty-five days in all, but a month might be lost at Alexandria by not reaching it exactly when the packet is starting, 797, 798.

The Cape of Good Hope route recommended for letters and passengers to Calcutta; that of the Great Desert and Persian Gulf to Bombay; the length of that passage would be eleven thousand five hundred miles; the time, sixty days; vessels to be changed at every station; twelve would be required, 799–804——The Pacha of Egypt wishes to have steam communication established; he would allow English troops to pass, and do anything in his power to facilitate the proposed intercourse; he has materials for a railroad from Cairo to Suez, 805–809——The rapidity of steam intercourse may induce the natives of India to come over to England for scientific purposes; they have hitherto objected to the sea, 810–813——Expediency of letting the civil and military officers of India return by steam to England, for their furlough, instead of going to the Cape of Good Hope; it would be reasonable to leave them the option, 814–830——Defects of the Indian regulations relative to furlough, 831–835——Explanation of the present plan of steam communication from Suez to Bombay; it will be a considerable time before it can be realized; persons sending letters to India must not yet rely upon steam conveyance; more steamers will be built immediately, 836–840——Steam packets go from Alexandria to Marseilles every ten days; the distance from London to Marseilles direct one thousand miles less than by Gibraltar; a table of the relative distances of the different routes to India handed in and read, 841–844.

Peninsula. See *Passengers,* 3.

Perim, Island of. Is the best depôt between Suez and India, *Peacock* 617–633, *Turton* 991, *Head* 1093–1098——It is ill calculated for a residence, having neither inhabitants, provisions nor water, *Turton* 991, *Head* 1093–1098.
See also *Camaran,* Island of. *Depôts. Stations.*

Periodicals. Steam navigation to India will increase the sale of periodicals and literary works of that description, *Johnstone* 1903–1905——By the present post-office arrangement can only be sent to India as letters, and paid for by weight, *Head* 1100.

Persian Gulf. See *Piracy. Steam Vessels,* 2.

Pilgrims. Rich pilgrims would in a short time make use of the steam vessels in their journies between Cairo and Suez, *Wellstead,* 490–493.——*See* also *Plague.*

Piracy. Piracy on the Indian Sea might be easily put down, *Henderson* 947–950—— The service against pirates should not be performed by vessels carrying the Bombay mails; piracy would be better opposed by steamers, *Melvill* 1309–1311——The system of piracy in the Persian Gulf described, *Brucks* 1859–1868——One steamer and one sailing vessel would suffice for the prevention of piracy in the Persian Gulf, *Lord W. Bentinck* 1945–1946.

Plague. The plague seldom leaves the immediate vicinity of Cairo and other cities of Egypt, although the caravan with pilgrims travels between Cairo and Mecca at all times, *Wellstead* 483, *Turton* 968——The plague need not affect the regularity of the intercourse between England and India, *Galloway* 886–888——Observations respecting the plague,

Plague—continued.

Turton 968, *Briggs* 1440. 1446, *Mackenzie* 1676–1678——Much merit due to the Pacha for his endeavours to prevent its introduction from Constantinople and elsewhere, *Briggs* 1440–1446——*See* also *Akkaba*, Gulf of. *Hedjekz. Packing Goods.*

PLAN FOR EFFECTING A STEAM COMMUNICATION WITH THE THREE PRESIDENCIES OF INDIA:

1. *Generally.*
2. *Advantages thereof.*
3. *Opinions of Persons resident in India thereon.*
4. *Number of Vessels required, &c.*
5. *Whether the plan would bear its own Expenses.*

1. *Generally:*

Any plan which does not embrace communication by steam with Madras and Calcutta, as well as with Bombay, will entirely fail to give public satisfaction, *Hobhouse, Ev.* 18——It is quite practicable to make a continuous communication to any port in India, *Head* 1088——The line of continuous communication should begin from England to Alexandria; combine all sources of profit, and be connected with commercial and post-office arrangements, *Head* 1100——Arguments against the tripartite scheme, *Melvill* 1252–1258——Communication with all the presidencies more practicable than with Bombay only, *Morgan* 1352——The steam communication should be established with all the presidencies, but if it is to be limited to one of them, Calcutta should be preferred, *Johnstone* 1892–1900. 1906——Communication between the different ports of India is desirable, the overland journey from Bombay being so inconvenient, *Elliott* 1518–1522——Opinion respecting an extended plan of steam navigation with India, comprehending the subjects of distance, number of steamers, their duties; expense and profits, *Lord W. Bentinck* 1935–1943.

2. *Advantages thereof:*

Steam communication with the different presidencies of India, in conjunction with the institutions already established for the education of natives, will form a strong power for humanizing India, *Turton* 1012——The comprehensive plan of communication by steam with India would be the cheapest, and the only one to secure permanency of intercourse, by preventing the receipts from being less than the expenditure, *Barber* 1046, 1047. 1075–1079, *Head* 1165——Copies of the plan of 24th May 1836, for a comprehensive steam communication with India, *Head* 1175——Difference between the plan first submitted to Government by the London Committee and that now given in, *Head* 1177, 1178——Both plans are equally practicable; the expense of the comprehensive plan is less in proportion to its receipts; miscarriage in the confined plan might lead to total failure, *Head*, 1179——Commercial intercourse will be greatly increased between this country and India by the greater facility of communication, *Lardner* 1584——A strong argument in its favour is that a very small proportional difference of expenditure will accomplish a much more advantageous result, *Grindlay* 1917, 1918——The great advantage of this plan is that a considerable part of its expense would, even at the outset, be paid by passengers, *Lord W. Bentinck* 1950, 1951.

3. *Opinions of Persons resident in India thereon:*

Parties at all the presidencies in India are prepared to support the measure; there would be no difficulty in accomplishing this object, provided it met with the approbation of Government and the East India Company, *Head* 1124——In India the feeling in favour of the comprehensive plan is as strong as possible, and almost universal; no other plan will afford either adequate accommodation or any general degree of satisfaction, *Grindlay* 1911–1913——The desire for the extended plan is universal and intense among the European residents and natives of India; the Bishop of Calcutta is very anxious to see it established, *Lord W. Bentinck*, 1952, 1953.

4. *Number of Vessels required, &c.:*

Number of steamers necessary for the comprehensive plan; tonnage, power and cost, *Barber* 1048–1051. 1053. 1063. *Head* 1109——Estimate of the expense of the different communications, first between England and Bombay, and from England to include all India, *Head* 1172——Number of vessels required for the entire line between Falmouth and the three presidencies; the communication could not be efficiently kept up with a smaller establishment, *Morgan* 1381–1387.

5. *Whether the Plan would bear its own Expenses:*

Steam to India upon the comprehensive scale, and with one continuous route, would more than pay itself, *Barber* 1075–1079——It is highly probable that the profits derived from the extended communication would be adequate to its expense, *Melvill* 1280–1286——With the present post-office arrangements it will not make an ample return, the cost of

PLAN, &c.—5. Whether, &c.—continued.

of conveyance of pamphlets, periodicals, &c. being tantamount to a prohibition, as they can only be sent as letters, and paid by weight, *Head* 1100——On any but the combined plan, there would be danger of insufficient returns, *Head* 1165.
See also *Steam Navigation to India.*

Pluto Steam Vessel. Was fitted with Collyer's boilers by order of the Lords of the Admiralty, *Morgan* 1413–1416.

Point de Galle. There is a strong current round the Point de Galle, which might make it difficult at times for steamers to round the point, *Nairne* 245–248——The best station for taking in coals during the south-west monsoon, *Peacock* 502–507. 671. 675, *Barber* 1061, 1062——The harbour of Point de Galle might be used as a port for steamers, *Dunn* 275, 276, *Brucks* 1845–1849, *Johnstone* 1889——It might be made efficient head-quarters for steamers at a considerable outlay; it would be superior to Trincomalee in every respect, *Brucks* 1845–1849.
See also *Calcutta and Point de Galle. Hoogly to Point de Galle. Madras and Point de Galle.*

Point de Galle to Socotra. The difficulties which would occur in making the passage from Point de Galle to Socotra enumerated; means of overcoming them, *Dunn* 283–304——Information respecting the different rate per mile at which a vessel would accomplish this passage under modifying influence of wind and current, *Dunn* 313–340——The passage to Socotra from Point de Galle might be easily accomplished during the south-west monsoon, by going through the eight-degree channel, *Wellstead* 418–420——A steamer could make a direct passage from Point de Galle through the Golandos Channel to Socotra, *Henderson* 926–930——If the machinery were damaged, the steamer could go under sail to Socotra, *Barber* 1033——It is easier to go from Galle to Socotra than from Bombay to Socotra, *Morgan* 1354, 1355.
See also *Dundra Head. Sails.*

Point Palmyras. Description of a voyage to Point Palmyras during a strong south-west wind, *Brucks* 1844.
See also *Hoogly to Madras. Hoogly to Point de Galle.*

Point Palmyras to Bengal. A steamer like the Berenice could go without difficulty from Point Palmyras in the south-west monsoon; could also go along the shore to Madras and on to Bengal; it is a weather shore, and there is little sea, *Wall* 845–852.

Point Palmyras to Madras. No difficulty in going down the coast from Point Palmyras to Madras, *Nairne* 211.

Population. The natives of Egypt have been very much drained of late years, in recruiting the army and navy of the Pacha, *Briggs* 1441.

Port Dues in Egypt. There are no port dues either at Alexandria or Suez, *Waghorn* 60, 61.
See also *Pacha of Egypt.*

Postage. The subject of the transmission of letters to India by the Red Sea considered, *Peacock* 696–710——There will be a heavy charge for letters to India by steamers; present arrangement between the Government and the East India Company relative to the postage of letters, *Peacock* 749–761——Rate of postage on letters and newspapers going by steam, adopted by the Court of Directors in February 1835, *Elliott* 1501——The Indian community very anxious to have publications, parcels, law papers, &c. transmitted by mail, not in the letter bags, but by the same conveyance; the transmission would contribute at least 15,000 *l.* a year, *Head* 1099–1108——The monthly conveyance of letters from India may even now be expected, but more steamers are requisite to insure it; in the meanwhile sailing vessels will to a great extent supply the deficiency, *Melvill* 1241–1245.

The conveyance of public despatches would be accelerated by sending them through France to Marseilles, instead of direct from England by the Malta packets, *Melvill* 1246, 1247——In all post-offices, improved communication is the first step towards increasing postage, *Elliott* 1504. 1515–1517——The posts throughout the Bengal presidency were accelerated when witness was there, *Elliott* 1505——Comparative statement of the average time occupied in the transit of mails from Calcutta to certain places, for the month of March 1828 and 1835, *Elliott, p.* 130, 131——Account of the postage of letters passing through Falmouth by the Mediterranean packets, *App. p.* 196.

Presidencies. See *Plan for effecting a Steam Communication with the three Presidencies of India.*

Price of Coals. See *Coals,* 4.

Public Opinion in India. There is no public opinion in India to serve as a check to abuse of office; by bringing India nearer to the mother country this want would, in a great measure, be supplied, and justice placed within the reach of everybody, *Turton* 1012.

Q.

Quarantine. The French arrangement, as regards the performance of quarantine, is better than our own; they reckon their quarantine from the time they leave the port; we do not reckon it till we arrive, *Waghorn* 134–136——It is essential to the success of the steam enterprise, considering it as a passenger line, that quarantine should be performed at Falmouth rather than at Malta; present rules of quarantine, *Lardner* 1631, 1632.

R.

Railroads. In all cases where railroads have been established, the intercourse has increased in an immense proportion, even where the price of the road was less than it now is by the railroad, *Lardner* 1569.

See also *Alexandria to Suez. Cairo to Suez. Mokattan Hills. Pacha of Egypt.*

Ramisseran and Manar. See *Adam's Bridge.*

RED SEA:

1. *Generally.*
2. *Steam Navigation to India.*

1. *Generally:*

Northerly winds generally prevail in the Red Sea, and are sometimes violent, *Waghorn* 11–13, *Wellstead* 464——Gales trifling, and last but two or three days, *Waghorn* 17——There are shoals on both the coasts, *Waghorn* 24, 25——No difficulty whatever arises in navigating the Red Sea, from currents or winds, *Waghorn* 78–80, *Wellstead* 465, 474–476——As regards the winds, both shores of the Red Sea are equally accessible, *Wellstead* 474–476——Best mode of arriving at practical facts respecting the Red Sea, *Waghorn* 157——The Atalanta and Berenice steamers well calculated for ascertaining the practicability of navigating the Red Sea, *Waghorn* 187–189——The currents in the Red Sea are unimportant, *Welstead* 465——Several ports on the western shore of Red Sea; this shore should be avoided; the navigation is more intricate and dangerous, *Wellstead* 474–476——The swell in the Red Sea is sudden, but transient, *Waghorn* 19——Advantages of changing the vessels in the Red Sea; their tonnage and power should be the same, for the convenience of transferring merchandize and passengers from one to the other, *Peacock* 502–507——The Pacha of Egypt has no steamer in the Red Sea, but contemplates having two for bringing his own produce, *Galloway* 880——The people along the shores of the Red Sea are very anxious to possess themselves of various manufactures, *Head* 1133.

2. *Steam Navigation to India:*

Statement respecting the best mode of effecting a system of steam communication with India by the Red Sea, *Waghorn* 1, *Ev. p.* 1–4——The voyage by the Red Sea decidedly preferable to that round the Cape for passengers; personal experience of that fact, *Turton* 1002, 1003——Communications have been received by witness from several commercial towns of England, Scotland and Ireland, desiring steam communication with India by the Red Sea, *Head* 1124——Enumeration of articles best calculated to make the Red Sea route pay, *Waghorn* 129–132——Whether the Red Sea route would be preferred, if more expensive than the Cape route, *Elliott* 1507–1509——The expense of the Red Sea route would not exceed that of the Cape, either in reference to passengers or commanders, *Grindley* 1914, 1915——The attractions, natural and historical, of the Mediterranean and Red Sea route would induce the majority to prefer it, *Grindley* 1914.

See also *Coals,* 4. *Commerce. Mocho and Suez. Pacha of Egypt. Passengers,* 2. *Steam Vessels,* 2, 3. *Suez. Trincomalee.*

Red Sea and Bombay. Five steamers at least ought to be employed between the Red Sea and Bombay, *Turton* 1005, 1006.

Reviews. See *Periodicals.*

Rosetta to Cairo. See *Steam Vessels,* 1.

Routes to India. See *Bengal. Bombay. Calcutta. Camaran. Ceylon. Helena, St. Hoogly to Madras. Lodhiana. Madras. Marseilles. Mocha. Paumbam. Plan for effecting a Steam Communication with the three Presidencies. Point de Galle. Red Sea. Socotra. Suez. Tootoocooreen. Trincomalee.*

S.

Sails. A steamer would probably receive assistance from some of her sails during the whole passage between Point de Galle and Socotra, *Dunn* 354——The north wind blows so much in the Red Sea, that a steamer might almost sail down, *Peacock* 730–738.

Report, 1837—*continued.*

Sea Water. Injurious effects of saline deposit, especially in the Red Sea, the waters of which are strongly impregnated with it, *Morgan* 1427–1430——The water of the Red Sea not likely to produce more deposit than that of any other sea, *Lardner* 1588–1590.

Shipbuilding. Remarks upon shipbuilding, machinery and equipment, with reference to expenditure, *Peacock* 584–596.

Sim, Lieutenant-colonel. (Analysis of his Evidence.)—Of the Madras engineers; surveyed the Straits of Manay in 1829; the passage of Pambam, lying between the island of Ramisseram and the coast of Coromandel, is practicable to a certain extent, 1183——Enumeration of the impediments to be removed before a channel of twelve or fourteen feet at high water could be obtained; current strong; the expense would be considerable, 1184–1191. 1206, 1207. 1220, 1221. 1229——A passage at Adam's Bridge, between the islands of Ramisseram and Manar, would be highly beneficial, and might be made, but the expenditure would be enormous, 1192–1205——One plan is to cut a new channel of twelve or fourteen feet deep through a tongue of land to the west; this would be the best, and might be accomplished for a moderate sum, 1207–1213——The channel between the island of Manar and Ceylon is out of the question, being never more than three or four feet deep, 1219——Tootoocooreen or Cochin recommended as the starting point for Indian passengers; they could go through the Pambam passage, when improved, to and from Calcutta in steamers drawing ten or twelve feet, 1222–1226——The inhabitants of Madras and the civil and military officers of India are very anxious for this communication with Bombay, the land route being inconvenient and expensive, and almost impassable by ladies, 1237–1238.

SOCOTRA:

1. *Generally.*
2. *Its capability as a Depôt for Fuel for Steam Vessels.*

1. *Generally:*

Is not unhealthy, *Waghorn* 105, 106——The climate insalubrious in the lower parts of the island, but quite healthy in the mountains, which are seven miles from the beach, *Wellstead* 375–383——Evidence respecting the harbours, *Wellstead* 364–374. 436——A powerful steamer could easily make the port of Socotra, *Henderson* 942–944, *Barber* 1036, 1037——Hulks should be placed at Socotra furnished with fuel, workshops and duplicates of machinery, *Lardner* 1568——Should be the point of junction for the two vessels from Calcutta and Bombay, *Lord W. Bentinck* 1948.

2. *Its capability as a Depôt for Fuel for Steam Vessels:*

Should be a depôt for fuel for steamers, *Waghorn* 1 *Ev.* 2, *Barber* 1061, 1062, *Head* 1091–1098, *Brucks* 1827——Consideration of the fitness of Socotra as a depôt for steam vessels, *Peacock* 612–616——Could be dispensed with as a depôt; it might be more advisable to use it as a depôt than to advance further to Perim or to Camaran, for though long runs save time, they overwork the vessel, *Peacock* 617–633——The establishment of a depôt at Socotra would bring a great deal of trade into it from the eastern coast of Africa, *Head* 1136——Would make a good depôt as far as anchorage goes, *Brucks* 1827.
See also *Bombay to Socotra.* *Mocha to Socotra.* *M*[illegible] *Calcutta.* *Point de Galle to Socotra.*

Socotra to Calcutta. Estimate of expense for communication between Socotra and Calcutta, *Head* 1172, *Ev. p.* 100.

Socotra to Suez. Calculation of the time it would take the Atalanta or Berenice to proceed from Socotra to Suez during the south-west or north-east monsoon, *Peacock* 676–695. 730–738——On returning the north wind blows so much in the Red Sea, that a steamer might almost sail down; part of the present plan is to send sailing vessels when steamers are unavailable, *Peacock* 730–738.

Soheia. Very objectionable as a depôt, in consequence of the shallowness of the water, *Wellstead* 469.

Split Paddle Wheels. See *Paddle Wheels,* 1.

Stations for Coals. Stations chosen by the East India Company as coal depôts during the voyage to Bombay, *Peacock* 510–517——Comparative estimate of the length of the passages from station to station, and of the time occupied in making them, *Peacock* 676–695——The shortest possible stations recommended, not only for the relief of the vessel and the men, but because long stages occasion a deposit of salt in the boilers, &c., *Morgan* 1893–1395——The expense of various stations would be more than counterbalanced by the diminished wear and tear of the vessels, *Morgan* 1396.
See also *Arabia.* *Camaran,* Island of. *Heavandoo* or *Heawandee* Island. *Helena, St.* *Hodeida.* *Jidda.* *Macullah.* *Madras.* *Mocha.* *Perim,* Island of. *Point de Galle.* *Socotra.* *Soheia.* *Tamarinda Bay.* *Tootoocooreen.* *Trincomalee.* *Yambo.* Also each Station under its respective Head.

Report, 1837—*continued.*

Steam Company. Report of the London Steam Company committee for promoting steam navigation to India, *App. p.* 193.

STEAM NAVIGTION TO INDIA.

1. *Generally.*
2. *Political and Commercial Advantages.*

1. *Generally:*

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STEAM VESSELS:

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3. *Size thereof.*
4. *Accommodation for Passengers.*
5. *Stowage room for general Cargo.*
6. *Annual Expense of Steam Vessels.*

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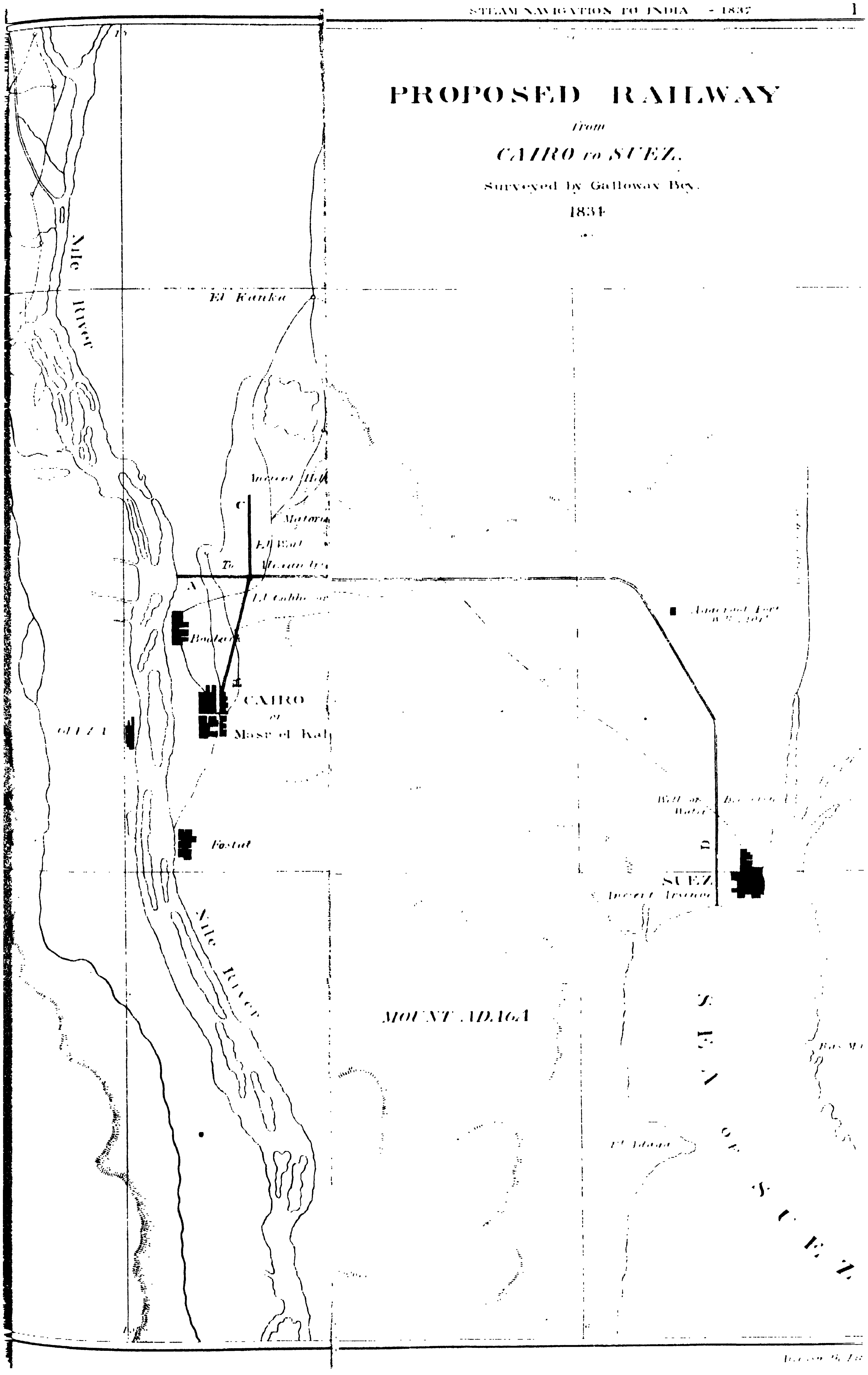

PROPOSED RAILWAY

from

CAIRO to SUEZ.

Surveyed by Galloway Bey.

1834.

TEA CULTIVATION (INDIA).

RETURN to an ORDER of the Honourable The House of Commons,
dated 15 February 1839;—*for*,

COPY of PAPERS received from *India* relating to the Measures adopted for introducing the Cultivation of the TEA PLANT within the British Possessions in *India*.

East India House,
22 February 1839.

JAMES C. MELVILL.

(Mr. Robert Gordon.)

Ordered, by The House of Commons, *to be Printed*,
27 *February* 1839.

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79	15 Aug. —	Mr. Secretary Macnaghten	Tea Committee	
79	15 Aug. —	Tea Committee	Mr. Secretary Macnaghten	12 Sept. —
80	12 Sept. —	Mr. Secretary Macnaghten	Tea Committee	
81	22 Aug. —	Mr. Chief Secretary Chamier	Mr. Secretary Macnaghten	19 Sept. —
81	9 July —	Lieut.-Colonel King	Chief Sec^y to Government	
82	9 Aug. —	Secretary to Madras Agricultural Society.	Ditto	
82	13 Aug. —	Commissioner, Mysore	Ditto	
82	12 July —	Superintendent, Coorg	Commissioner, Mysore	
83	26 July —	Superintendent, Nuggur Division.	Officiating Secretary to Commissioner for Government of the territories of Rajah of Mysore.	
83	18 Oct. —	Captain Jenkins	Secretary to Tea Committee	
84	1 Oct. —	Superintendent of Tea, with a Sketch, No. 2.	Captain Jenkins	
87	14 Nov. —	Mr. Secretary Macnaghten	Tea Committee	

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87	12 Jan. 1837	Tea Committee	Mr. Secretary Macnaghten	23 Jan. 1837.
88	4 April —	Secretary, Tea Committee	Ditto	17 April —
89	2 March —	Mr. Assistant-surgeon Griffith.	Secretary, Tea Committee	
89	19 Jan. —	Captain Jenkins	Secretary, Tea Committee	13 May —
89	20 Dec. 1836	Superintendent of Tea	Captain Jenkins	
90	15 Feb. 1837	Captain Jenkins	Secretary, Tea Committee	
91	20 Dec. 1836	Superintendent of Tea	Captain Jenkins	
91	13 March 1837	Mr. Secretary Macnaghten	Tea Committee	
92	20 Feb. —	Captain Jenkins	Secretary, Tea Committee	
92	10 Feb. —	Superintendent of Tea	Captain Jenkins	
92	5 Sept. —	Secretary to Tea Committee	Mr. Secretary Macnaghten	25 Sept. —
93	11 Dec. —	Extract Resolution of Government		11 Dec. —
93	30 Nov. —	Secretary, Tea Committee	Mr. Officiating Secretary Mangles.	
94	11 Dec. —	Mr. Officiating Secretary Mangles	Tea Committee	
95	12 Dec. —	Secretary, Tea Committee	Mr. Officiating Secretary Mangles.	29 Dec. —
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96	30 Dec. —	Tea Committee	Mr. Officiating Secretary Mangles.	15 Jan. 1838.
97	15 Jan. 1838	Mr. Secretary Macnaghten	Ditto	7 Feb. —
97	7 Feb. —	Mr. Officiating Secretary Mangles	Secretary to Tea Committee	
98		Extract Report by Mr. Assistant-surgeon W. Griffith. Chart of China. No. 3. Chart of Upper Assam. No. 4. Chart showing the distribution of the Tea Plant between Assam and the 24th degree north latitude. No. 5. Drawings of Assamese specimens. Nos. 6, 7.		
107	25 Sept. 1837	Mr. Secretary Macnaghten	Secretary, Tea Committee	25 Sept. 1837.
107	5 Oct. —	Captain Jenkins	Ditto	30 Oct. —
109		Report by Mr. Bruce, with Sketch of the Kahong River, and Rough Map of the Singpho, Muttuck, and part of the Rajah Purundah's country, &c. Nos. 8 to 11.		
115	30 Oct. 1837	Mr. Officiating Secretary Mangles	Tea Committee	
115	20 March 1838	Tea Committee	Mr. Officiating Secretary Mangles.	9 April 1838.
117	9 April —	Mr. Officiating Secretary Mangles.	Tea Committee	
117	29 March —	Secretary to Tea Committee	Mr. Officiating Secretary Mangles.	
118	17 May —	Ditto	Ditto	21 May 1838.

East India House,
22 February 1839.

T. L. Peacock,
Examiner of India Correspondence.

COPY of PAPERS received from *India* relating to the Measures adopted for introducing the Cultivation of the TEA PLANT within the British Possessions in *India*.

MINUTE by the GOVERNOR-GENERAL.

IT is not necessary that I should trouble the Council with many remarks to support the abstract question of the great advantage which India would derive from the successful introduction of the tea plant; and the only points for consideration are, whether there are not reasonable grounds for the conclusion, that there must be, in all the varieties of climate and soil between the Himalayas and Cape Cormorin, combinations of both, that must be congenial to this particular plant; and next, how far it may be practicable to have from China cuttings of the true and best descriptions of the plant, and knowledge and skill for its cultivation, and for the subsequent process of preparing the leaves for use.

The subject was first urged upon my notice in London immediately after I received my appointment, by a very intelligent gentleman of the name of Walker, whose memorandum I submit for the perusal of the Board. Dr. Wallich remarks, that though some of the opinions are erroneous, there is much in the paper that is valuable and deserving of attention.

It appears that both the present President of the Board of Control, as well as the East India Committee, have had the subject under their consideration. The best evidence obtainable perhaps, not only in India, but elsewhere, is that of Dr. Wallich. This will be found in the reports; but for more convenient reference, I have obtained from him a copy of his letter to Mr. Grant, which contains all the information that can be obtained out of China upon this subject.

The naturalization of so many foreign plants and vegetables, the natives of climates very different from our own, would of itself afford very sufficient encouragement for any attempt of this kind. There are, however, some shrubs and trees that are familiar to us, of such delicacy as hitherto to have languished wherever transplanted; the mangostein is one of these; the claret grape has deteriorated in every other spot, and probably the same is the case of the hock grape. In both instances, the desideratum has been a peculiar soil, united to a particular climate. We have no such cause of apprehension with regard to the tea plant, which flourishes over a space embracing many degrees of longitude and latitude. As a practical agriculturist, I am inclined to think that few of the foreign herbs and plants, that are become not only naturalized, but also the mainstays of our agriculture, did not afford in the first instance a greater promise of successful experiment.

The only real difficulty that occurs to me, is the impossibility of having access to the tea countries, and of thus having personal and local knowledge of all particulars relating to the cultivation and manufacture. If I had not been to the eastward, when the opportunity was given me of observing the character of the Chinese adventurers there, their superior energy, their industry, their spirit of speculation and calculation of profit, quite equal to that of any European nation, I should never have entertained the conviction, which I did from that moment, that this or any other scheme was perfectly practicable through Chinese agency. I therefore now most strongly and confidently recommend that the attempt should be made; and I propose that a Committee, of which I will present a list hereafter, shall be formed, for the purpose of submitting to Government a plan for the accomplishment of the object, and for the superintendence of its execution.

My own idea is, that an intelligent agent should be selected, who should go down to Penang and Singapore, and in conjunction with the authorities there, and the most intelligent of the Chinese agents, should concert measures for obtaining the genuine plant, and the actual cultivators, who upon inspection of those spots, that upon their representation of the requisite peculiarities of soil and climate, shall have been selected as the most eligible, shall then be employed, under the promise of a liberal remuneration, to carry on the cultivation. I know no one better qualified to select the best means adapted to the end than Mr. Gordon, of the late firm of Mackintosh & Co.

(signed) *W. C. Bentinck.*

Calcutta, 24 January 1834.

(True copy.)

(signed) *W. H. Macnaghten,*
Secretary to the Government of India.

Extract India Revenue Consultations, 1 February 1834.

No. 4.

Proposition to the Honourable the Directors of the East India Company to cultivate Tea upon the Nepaul Hills, and such other parts of the Territories of the East India Company as may be suitable to its growth. By Mr. *Walker.*

The commercial relations of this country with China have lately assumed a character of uncertainty, by no means corresponding to the importance of the trade, or consistent with the dignity, of the British empire. This unsatisfactory state of affairs has originated from a combination of causes and occurrences spread over a long series of years, amongst which may be enumerated: the jealous policy of the Chinese Government in her intercourse with all nations; the apprehension which she has always entertained of our formidable empire in the East Indies; the ignorance, pride, and prejudice of the Government; a consciousness of her own strength in some points, and her weakness in others; the rapacity and corruption of her officers, and occasionally the misconduct of our own people.

The strange policy of this singular nation has confined us for the present to the port of Canton, (in former times we had access to other ports,) situated at the western extremity of the empire, and furthest from Pekin, the seat of Government: even in the city of Canton, barriers are fixed, beyond which no Englishman can pass; so that all commercial men who go to China, see about as much, and know about as much of China as a Chinese would of England, or of London, if he was confined to Wapping, and not permitted to go beyond the Tower.

The fears of the Chinese Government have lately been excited by the brilliant and rapid progress of our arms, and the prodigious extension of our Indian empire, which in the North and North-East has its boundaries almost upon the very frontiers of China. Nor can we imagine that the successful termination of the Burmese war will at all contribute to allay the irritation which has so long existed.

But, without further causes of irritation, and considering things as they are, many of those amongst the best informed upon the subject suppose it not improbable, that at no very distant period, and from some apparently accidental event, not only the British nation, but all foreigners, may be prohibited from entering the Chinese territories, as all are now excluded from Japan, excepting only the Dutch, who are permitted to send one vessel annually, the crew of which perform the degrading ceremony of trampling upon the Cross (to show that they are not Christians) as a passport to enter the country. Some, indeed, may flatter themselves that the magnitude of our trade renders it necessary to the Chinese; that the wealth acquired by the sale of their teas to Europeans would render it of importance to the Government to continue the trade; that tea, the produce of their agriculture, with many other articles, would become unsaleable, and of no value; with many fancies of a similar nature. We must not deceive ourselves. The empire of China is the greatest, most extensive, and most populous, that exists in the world, or has existed in ancient or modern times, and contains everything necessary within itself. Internally, the empire is admirably well regulated, and from the inflexibility of its decisions, by which the Government is probably maintained, it is internally the most powerful upon the face of the globe; but as the severest measures have been adopted to keep everything stationary, and to avoid variation and change *, the arms and science of the Europeans have so far outstripped those of her subjects, that the forces of China would be almost powerless against European tactics, and for the most part only able to contend with such of the neighbouring states as have not made a progress in civilization or in science beyond her own.

The Government reposes in reasonable confidence that her seas, her deserts, and her mountains, aided by her immense population, will form an effectual barrier against any invader whose cupidity might be excited by the prodigious wealth of her provinces to make an attack. Should any capricious or timid monarch or minister, in petulance, banish all strangers, not the smallest resistance would be made by the people, nor any serious efforts to renew the intercourse; and it seems well ascertained, that though the suspension of the trade might produce some inconvenience to the parties immediately concerned, yet ultimately that it would not create any derangement in the affairs or revenues of the kingdom, or even in the price of tea.

When an interruption in the trade between Russia and China occurred in the reign of the late Empress Catherine, (to which we are indebted for the introduction of our woollens into China, and our calicoes into Russia,) in consequence of some fray at Kiatka, the frontier town of Russia, (at which place alone the trade is permitted to be carried on,) the Empress, after the trade had been suspended seven years, wrote to the Emperor of China, the late Kein Lung, requesting that the trade might be renewed. The monarch of the celestial empire replied to the despatch, by calling the Russians, beasts, dogs, animals, but added, that as he wished to be at peace with all the creatures upon the earth, if the trade was necessary to the Russians, it should be renewed. Kein Lung was an author and a poet; Catherine was an author; and it was said, she was more vexed at this answer than at any despatch received during her reign.

In this renewal, however, the Russians were compelled to receive in exchange for their Siberian furs, &c., the mouldy teas, mildewed calicoes, musty rhubarbs, &c., which had been there for some years, being courteously informed by the Chinese, that as these articles had been brought from a vast distance across the desert on purpose for them, until they were gone they could obtain no others. The Russians submitted with the best grace they could, took the damaged articles, and the trade was renewed.

For many years the consumption of tea has been increasing in this country; it has become a luxury to all, and almost a portion of food to the common people, who in some districts drink it three or four times a day. Its use is so intermingled with our habits and customs, that it would not easily be dispensed with; and from its almost universal consumption, the Government derives a revenue of 4,000,000 *l.* per annum. The original purchase or prime cost, with the shipping, &c. concerned in the trade, must of course amount to a very large proportion of the same sum. The quantity consumed in the United Kingdom exceeds 25,000,000 of pounds per annum; and the annual cost to the people of this country, including the duty, is about 8,000,000 *l.* sterling.

It is, therefore, of considerable national importance, that some better guarantee should be provided for the continued supply of this article, than that at present furnished by the mere toleration of the Chinese government, which, although the Chinese have at present a monopoly, it will be easy for us to destroy.

It has been generally imagined that China was the only country where the tea plant would grow, or where it could be cultivated and manufactured. Recent investigations have dissipated this delusion; for we shall find that the Burmese, the Japanese, and Brazilians, as well as the Chinese, have cultivated tea with success; and we may confidently state, that if in future we are not rendered independent of the Chinese, by producing tea from our own territories and colonies, it will be our own fault, and we shall merit continuation of that insolence from the Chinese government which all the publications relating to the embassies of Lord Macartney and Lord Amherst so amply and so minutely describe, as well as the unremitting extortions and persecutions of the Chinese officers to the few agents who carry on the trade at Canton.

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* A worthy and wealthy friend of the author of this memorial, many years engaged in the Chinese trade, was requested by one of the most opulent merchants to obtain for him an European flower-mill, which commission he readily undertook; when he left Canton there were 19 vessels in the harbour. The Chinese merchant wrote to him, not by one only but by every one of the 19 vessels, imploring him not to bring the mill, for if it was introduced he should infallibly lose his head. Another Chinese merchant, convinced of the superiority of our square-rigged vessels, fitted out his own in the European manner; the man was bastinadoed and imprisoned. The fate of the steam-vessel sent by the India Company to Canton is well known.

Within a very short period, an alteration in commercial productions, almost equal in importance to that of tea, has occurred in the instance of indigo: all the indigo used in this country was formerly grown in Guatimala, which exported, when under the dominion of Spain, about 1,200,000 lbs. per annum. Since the cultivation of indigo in the East Indies, nealy 6,000,000 lbs. have been annually imported into this country from the East Indies.

In an unpublished manuscript note of Dr. Buchanan, in the library of the East India Company, upon the Birman empire, he says, "but the chief plant of renown is the tea plant, which grows in the woody, mountainous district to the N. E. and S. of Umerapoora, as well as in various other parts of a similar character. It is cultivated by the Sheen, who inhabit the towns on the Irrawady; they bring it in large baskets to Umerapoora, whence it is dispersed all over the kingdom." The tea districts of China, we should observe, are in the same latitude, and the plant is common in mountains of the same elevation.

In Don's 'Prodromus Flora Nepaulensis' it is stated, that the tea plant is found in Nepaul; but he expresses a doubt whether it is, or is not, indigenous to Nepaul. That it exists there, there is no doubt; for the Honourable Mr. Gardiner, resident of the East India Company at the court of Nepaul, found it flourishing in a garden at Katchmandu, the capital, and sent a plant down to Dr. Wallich, the director of the East India Company's botanic garden at Calcutta, in 1816, from whence Dr. Wallich transmitted a specimen to Sir Joseph Banks, with the observation, that in the low, humid climate of Calcutta it was always a sickly plant.

Mr. Abel, the botanist who accompanied Lord Amherst upon his embassy to China, says, "The question whether the tea plant will grow in any other country than China, has, in a great measure, been settled by the success of the tea plantations at Rio Janeiro, made under very little encouragement. It may, however, be worth considering, what are the countries in which it is most likely to succeed, from their relation to its natural places of growth. The green-tea districts, in the province of Keang Nan, are embraced between the 29th and 31st degrees of north latitude, and are situated in the north-western base of a ridge of mountains, which divide the provinces of Keang Nan and the Keang See.

"The black-tea districts, in the province of Fo Kien, are contained between the 27th and 28th degree of N. latitude, and are situated on the S. E. declivities of a ridge of mountains, dividing the province of Fo Kien from that of Keang Nan. Thus the whole range of the great districts of China, from which Europe is supplied with tea, from the highest to the lowest degree of latitude, is from 31° to 27°. According to the missionaries, the tea plant thrives in the more northern provinces, as at Pekin; and from Kempfer, it would appear that it is cultivated in Japan as far as 45° north.

"From every account given of the tea plant, it succeeds best on the sides of mountains, where there can be little accumulation of vegetable mould; our opportunities of seeing its cultivation were few, but were all in favour of this conclusion. The plantations were always at some elevation above the plains, in a kind of gravelly soil; formed in some places by disintegrated sand-stone, and in others by the debris of primitive rocks. A large and flourishing plantation of all the varieties of the tea plant (brought together by Mr. Bell, the principal tea inspector at Canton) is situated on an island close to Macao, in a loose gravelly soil, formed by the disintegration of large-grained granite. Judging from the specimens collected in our route through the province of Keang Nan, whence the green tea is provided, the rocks consist chiefly of sandstone, schistus, and granite: as to the precise nature of the rocks of the black-tea country, in the province of Fo Kien, I have no exact information; but as the great ridge, separating that province from Keang Si, is a continuation of one separating the latter from Canton, it is perhaps legitimate to conclude, that their constituent rocks are the same, and that the hills and soil on the eastern side are the same as we found them on the western side of the ridge, and that they are covered by a soil like that in which the camellia flourishes; the vegetation chiefly consists of the same kind of plants. But the success of the American plantations proves that the tea plant will flourish within the tropics; and that it will grow vigorously within them, is proved by the fine plants in Sir H. Lowe's plantations at St. Helena.

"If ever it should suit the policy of this country to derive the tea from any of our own dependencies, there can be no doubt we shall soon cease to be indebted to China for an article that enters so largely into the comforts of all classes of our countrymen. I have heard much of the difficulty of transplanting plants from China, in sufficient numbers and in such health as to give a fair chance to any experiment for the cultivation; but I cannot imagine where that difficulty exists.

"A great number of plants which were on board the Alceste, for the purpose of being left at the Cape of St. Helena, were in the most vigorous state the day previous to the wreck, and there can be no doubt would have arrived thus at the place of their destination.

"At Rio Janeiro," Mr. Abel observes, that "the botanic garden is of considerable extent; but it has no other care bestowed on its management than what it receives through the judgment and exertion of Senhor Gomez, whose particular appointment is that of superintending some gunpowder mills in the neighbourhood.

"This gentleman, notwithstanding the defects of its establishment, has contrived, by the aid of a few Chinese gardeners, to cultivate the tea plant with great success. The tea plant was in great vigour at the time of my visit, and its leaves have been effectively and repeatedly manufactured. The process was very simple. The leaves are gathered during the month of January, after heavy falls of rain, before they are wholly expanded, care being taken that no foot stalks are mingled with them. They are then put into an iron vessel, and exposed to heat till they begin to shrink, when they are taken out and rolled between the hands until they are spirally folded. They are then returned into the vessel and again exposed to heat, till it becomes intolerable to the hand, which continually agitates them to prevent their burning, and then the process is finished."

The writer of this paper has received some of this tea from his friend Mr. Chamberlain, his Majesty's consul at Rio Janeiro, and has given specimens to many gentlemen at the East India House. Since the above was written, the author has been informed, from undoubted authority, that though the Government plantation at Rio has very much declined, and the Chinese dispersed, that private individuals have successfully cultivated the tea plant at St. Paul's, to a considerable extent. One person, some time ago, had purchased 2,000 acres of land for the purpose of planting the whole with the tea plant. A quantity of the St. Paul's tea has been brought to Europe; it is manufactured entirely by the natives; in quality it is far superior to the Rio Janeiro tea, and so little inferior to the Chinese, that the difference is scarcely perceptible. All the tea produced at St. Paul's is green tea. Latitude of St. Paul's about 21°.

Mr. Abel continues, "I have often been asked, whether there be more than one species of the tea plant? This question I have not been able satisfactorily to answer. I had little doubt, when examining the different plants, that there were two species, but I could not at that time define their characters, and have since lost the specimens by shipwreck." This question, which has so much interested the botanists, whether the green and black teas are produced from two distinct plants, does not appear to be of much practical importance, as it is admitted, both by Abel and Dr. Letson, in his history of the tea tree, that either of the plants will afford the black or green tea of the shops.

"As" adds Mr. Abel, "the colour and quality of the tea does not depend upon the botanical difference of the species, it must arise from some peculiarity in the mode of manufacturing it; namely, in the due management of the heat used in the preparation and drying the leaves. There can be but little doubt that a leaf dried at a low temperature will retain more of its original colour, and more of its peculiar qualities, than one which has suffered a high degree of heat; and I may add, that the strongest tea I tasted in China, called 'Yu tien', used on occasions of ceremony, scarcely coloured the water, and the leaves upon examination were found to consist of the scarcely expanded buds of the plant."

Green tea is made from the first buds of the plant before the leaves are developed. The best kinds of souchong are derived from the leaves when perfectly formed, and at the exact period of maturity. The bohea and common souchong teas are made in a great measure from the mere gleanings of the leaves, which have passed the period of their perfection, and when, like the withered leaves of autumn, they are nearly dismissed from the service of nature, as unable to contribute to the offices of the vegetable economy.

The Chinese communicate a great variety of flavours to tea, by simple arts. The flowers of the Olia fragrans are dried and mixed with their finest teas, to give them fragrance, and a delicate flavour is communicated by a combination of the blossom buds. When the dried leaves are removed from the iron-pan in which they are torrefied, children are employed to touch slightly the leaves with a camel-hair pencil dipped in spirituous solutions of resinous and aromatic gums.

The cowslip souchong receives its peculiar flavour from this process.

The process of drying and manufacturing the tea is very simple. In Japan, there are public buildings or drying-houses for curing the tea, and so regulated that every person who either has not the suitable conveniences or requisite skill, may bring his leaves at any time to be dried. In China, the dealers purchase the leaves of a tea plantation as our fruiterers buy the fruit of an orchard, pluck the leaves, dry them slightly to enable them to bear the carriage, and manufacture them afterwards at their convenience and leisure. The green teas are exposed to the sun in wicker-baskets for 36 hours, and then dried over the fumes of burning indigo; a very slight portion of indigo mixed with powdered gypsum being delicately sprinkled over the tea when packed, to heighten the colour. The black teas are torrefied three or four times in the manner above described, to suit the fancy and palate of the owner. (*Vide* Kempfer and Letson on the tea plant, where the plans of the stoves are described.)

The cultivation of the tea plant is also extremely simple. Kempfer states that in Japan, no particular gardens or fields are allotted for the plant, but that it is cultivated round the borders of rice and corn fields, something like our hedges, or the apple trees in the fences in Hereford and Worcestershire, without any regard to the soil. Any number of seeds, as they are contained in the seed-vessels, not less than 6, or more than 12 or 15, are promiscuously put into one hole, made four or five inches deep in the ground, at certain distances from each other. The seeds contain much oil, which is liable to become rancid, and only about one-fifth generate. The seeds grow without any other care, but the more industrious usually remove the weeds and manure the land. In three years the plants are strong enough to bear denuding of their leaves, which are then plentiful and in their prime. In about seven years the plant rises to 15 or 20 feet in height; it then bears few leaves, which grow slowly; it is then cut down to the stem, which occasions such an exuberance of fresh shoots and leaves the next summer, as abundantly compensates the owners for their former loss and trouble. Some defer the cutting till the plants are of ten years' growth.

In China, where the manufactory and cultivation are great, large plantations are made, and the trees cultivated with great care.

The cultivation of the tea plant, its management and treatment in China, are generally so simple and so well understood, that no difficulty is to be apprehended in bringing its manufacture and cultivation to a successful issue, in soils and climates fitted for the purpose. From the distance of the country, and the magnitude of the object, however, it is absolutely necessary that funds should be provided to meet the probable contingencies and emergencies, and ensure success in a reasonable time.

It is therefore proposed, that the East India Company should resolutely undertake the cultivation upon the Nepaul hills and other districts, where the camellia and other plants of a character similar to the tea plant are indigenous.

At present, the hills in question are of very little value to the East India Company, and have very few inhabitants, the territory acquired from the Goorkahs having been merely taken as a frontier. At the commencement of the cultivation, it will be necessary to obtain plants and seeds from China and other places. The plantations should also be protected by inclosures, and a few Chinese families, accustomed to the cultivation and preparation of tea, should be employed to instruct the natives. The Chinese may be easily obtained at Calcutta, or some of the islands in the East Indian Archipelago, or at Canton.

We can scarcely doubt that, when the skill and science of the Europeans, aided by thermometers, &c., shall once be applied to the cultivation and preparation of tea in favourable situations, the Chinese tea will soon be excelled in quality and flavour. Within the last three or four years, the quality of the tea is more uniform at every tea sale of the East India Company, where many thousand chests are sold every six weeks. Five or six chests were included in each lot, but the catalogue formerly very candidly gave the distinguishing marks of "musty," "fusty," "woody," "dusty," to almost every chest in the lot but one. The grocers mixed them as well as they could; the public complained of the quality and its price; but as they had no remedy, drank it and bought another portion with the hopes of better success. The complaint has been almost universal, that the fine teas are not so good now as some years back, but it is understood that the East India Company have exerted themselves to remedy the evil. It is not, however, in the consumption of the United Kingdom alone, that a market would be found for its produce. The whole Continent of Europe has lately adopted its use in a greater or less degree, and in many countries, such as Canada, the United States, and the Barbary coast, the consumption has become very considerable.

In the territories of the East India Company, the consumption would be prodigious. It is now used as a luxury, and a medicine in cases of sickness. The Hindoos live chiefly upon rice and flour; their only drink is water. If tea could be obtained by them at a moderate price, it would form a most refreshing addition to their domestic economy, as well as a salutary beverage in those fatal febrile affections to which the oppressive heat of the climate predisposes them. The consumption of Calcutta at this moment is considerable.

From the most correct information which can be obtained, it is not perhaps possible upon the face of the globe to find a country so admirably situated as the districts of India, where the soil, climate, and low price of labour, combined with the quiet and peaceable habits of the neighbouring population, offer such a concurrence of circumstances favourable to the undertaking.

There are, however, many other and very important considerations to induce the Company to undertake the cultivation of tea in their own territories, besides obtaining tea of a superior quality, and rendering us independent of the monopoly of that singular people, the Chinese, for this excellent beverage.

The inhabitants of India have little or no occupation excepting that of agriculture; and the cultivation and preparation of tea would admirably accord with their sedentary and tranquil habits. The skill of our manufacturers has not only totally superseded the introduction of muslins and cottons from India, but the exportation of Manchester and Glasgow cottons and muslins to India has so deluged the Indian markets, that many thousands of the native weavers are ruined, and in the greatest distress. Their economical habits also render labour extremely low in price. Tea, like almost all other articles, is the produce of land and labour. A man can gather about 15 lbs. of tea leaves per day. The price of labour in India is from 2*d.* to 3*d.* of our money per day: in China, the price of women's labour is about 5*d.*, of men's 7*d.* per day; and in some instances almost as high as in England.

The East India Company are much at a loss to provide some reasonable occupation for the natives, to promote peaceful habits of industry amongst them. It is also an object of great importance to the East India Company to obtain facilities to bring home their territorial revenues, which at present they have very imperfect means of doing; in many instances the loss in exchange has been dreadful.

The boasted mines of South America have furnished Europe for the last two centuries with many hundred millions of the precious metals, of which it is well known a very small portion has remained in Europe. China, with regard to bullion, has, until lately, been that "bourne from whence no traveller returns."

They have received almost all the bullion of Europe, principally in payment for tea. A few millions of dollars, it is said, have been obtained very lately from China, in payment for East India cotton; but none could give any account of what became of the hundreds of millions of dollars sent in the last two centuries to China to buy tea. The dollars were never seen after delivery, and no human being could conceive what became of them; but, for want of a better conjecture, many have fancied that the Chinese buried them. The Chinese dealings are in ounces of silver; for they have no coin except some miserable scraps of zinc or copper, not exceeding our farthing in value, and no paper circulation. Every one must have remarked that, within this century, Europe has laboured under an augmented consumption, and a diminished supply of the precious metals; for proof of the diminished supply, *vide* Flores d'Estrada and Fletcher.

The same duties and financial regulations which exist in England at present would of course continue, and there could be no apprehension of any diminution to the revenue; but as this undertaking would necessarily extend our intercourse with the natives of India, it may be supposed that in some shape or other it would much contribute to the consumption of British manufactures, and increase the prosperity of our empire in the East, and also annihilate the Chinese monopoly, which it is the object of these proposals to destroy.

(True copy.)

(signed) *W. H. Macnaghten,*
Sec^y to the Gov^t of India.

EXTRACT INDIA REVENUE CONSULTATIONS, 1st February 1834.

No. 5. OBSERVATIONS on the Cultivation of the Tea Plant, for Commercial purposes, in the mountainous parts of Hindostan; drawn up at the desire of the Right honourable C. Grant, President of the Board of Control for Indian Affairs, by *N. Wallich.*

IT has been usual to look upon the tea plant in the light of one of those vegetable productions, of which the natural growth is limited within narrow geographical boundaries; and to imagine that, like the nutmeg, the clove, the cinnamon, camphor, and other trees of extensive commercial importance, its native country occupies but a small and confined spot on the surface of the globe. Without entering in this place into any unprofitable discussion as to its probable origin in one particular spot, in China or Japan, it may be fairly assumed, that the tea plant has from time immemorial continued the very reverse of being circumscribed or local in the geographical extent of its distribution, inasmuch as it grows wild, or at least in a perfectly naturalized state, and maintaining all the properties of the genuine plant, on a vast space, comprising not less than 30° of latitude and 35° of longitude. But, although the shrub is thus widely dispersed, although it is found within the tropics as far south as the 17th degree of north latitude, in Cochin China, and beyond the equatorial regions so far north as 45°, in Japan, it will be proper on this occasion to consider the plant only with reference to its existence in China, since it is the commodity as obtained exclusively from thence which forms the basis of the present inquiry. By far the most important cultivation of the plant is carried on in the provinces of the Chinese empire, situated between the 27th and 30th parallels of north latitude, where the black teas are almost entirely produced; but it is also reared in vast quantities to the south, nearly as far as the sea-shore in Canton, and to the north as far as 40° in the mountainous regions beyond Pekin.

There is a remarkable circumstance connected with this part of my subject, which is deserving of attention. Unlike a great many other objects of great agricultural interest, or general utility, the botanical genus to which the shrub yielding the tea leaf belongs, consists of no more than one single species, and the small natural group to which it appertains comprises only one other genus, namely, the camellia. This genus, together with its near ally, the tea shrub, belongs exclusively to the eastern hemisphere; it consists of several species, which have been found wild in Japan, China, Cochin China, in Nepaul, and on the mountains bordering on the north-east frontiers of Bengal. Neither of these two genera have ever been met with in any part of the western hemisphere.

With respect to the natural character of the tea plant, it is altogether foreign to my plan to enter into any great detail. It is a hardy evergreen shrub, attaining a man's height, easily raised from seeds, and multiplied by cuttings or layers. It endures the vicissitudes of widely different foreign climates so well, that it has been ascertained by experience it will grow luxuriantly within the tropics; and even in this country it will bear the winter in sheltered situations, in Devonshire and Cornwall, although it rarely blossoms, except in the stove or conservatory. It requires but little care during its tender age, except what is called for by the perishable nature of its seeds on account of their oiliness, and by the ordinary precautions of manuring and protection of the young plant. Few plants are more indiscriminate in their localities of soil and climate: for it is cultivated on comparatively low and depressed situations, as well as on the brows of rugged hills. The plant, generally speaking, is contented with a gravelly or sandy soil, mixed with a scanty proportion of vegetable mould; but it delights most in shady declivities of hills, in moist vallies and the banks of rivers, situations which are peculiarly favourable to the luxuriant growth of the superior sorts of teas, being temperate and mild in their alterations of heat and cold, and other atmospherical changes, exposed to the sun of a genial summer during one half of the year, and sheltered from intense degrees of frost and snow during winter. It may therefore be safely assumed, that the shrub is cultivated to the greatest advantage in a temperate climate, where the thermometer ranges between 30° and 80°, where the heat in the summer season is never scorching or dry for any length of time, and where the winter is not marked by any very severe frost or snow.

The introduction of so valuable a plant into countries foreign to its own must always have been an object of anxious solicitude, and we find accordingly that various attempts have been made to accomplish it. The ultimate results, however, have always been extremely unsatisfactory, owing to circumstances which could have produced no other consequences, and which, as will be presently seen, have entirely vitiated every practical inference to be deduced from the experiments themselves. The shrub has indeed become naturalized in several remote and dissimilar countries; but the quality of its produce has invariably proved greatly deteriorated, or altogether changed from that of the present plant. Before I proceed to give some particulars of the experiments that have been made, it may be proper to premise a few observations on the conditions which ought at all times to regulate our attempts at naturalizing, for any useful purposes, the vegetable productions of one country in another.

An exact conformity of soil and atmospheric phenomena constitute the obvious data by which we are to be guided on such occasions. But since it does not often happen that accurate or sufficient information can be obtained upon those points in remote parts of the world, we must have recourse to the general laws that have been found to prevail in the distribution of heat and the other conditions of the atmosphere, with regard to latitude and other well-known circumstances, and a judgment has to be formed from a calculation of probabilities, instead of from a comparison of exact data. In all cases where a favourable combination of both the direct and the collateral arguments forms the basis of an agricultural undertaking of this nature, the result of it cannot fail to prove successful.

The first point which must be ascertained is, how far the countries are likely to correspond in the degree of their temperature. The probability of a conformity in this respect may, as a general rule, be judged of by the agreement or disagreement of their latitudes, provided the countries in question are both situated in the same hemisphere. For although latitude does not go along with temperature, if we compare the eastern with the western hemisphere, the latter being generally colder than the former on the same parallels both south and north of the equator, the mean temperature of 40° north latitude in the old world being 63°, while in the new world it is only 54°, and that of the Mauritius in 20° 9′ south latitude being 80° 4′, while that of Rio Janeiro in 20° 59′ south latitude is only 74° 3′; yet in the same hemisphere the isothermal lines (or imaginary lines connecting places in which the mean temperature of the year is the same) do nearly accord with the parallels of latitude, with a few exceptions. This, however, is very much regulated by the geological formation of a given country; mountainous districts being much colder than low, flat regions situated to the northward of them. It has been calculated that, in tropical countries, the decrement of caloric as we ascend in the atmosphere is equal to 1° north latitude for every 396 feet of vertical elevation; so that the temperature of land 4,512 feet above the level of the sea in 10° north latitude, would approximate that of open, flat countries on a level with the sea in 22° north latitude. But beyond the tropics, in Europe at least, it is supposed that the reduction of temperature is nearly equal to 1° north latitude for every 540 feet of perpendicular height.

But as vegetation is less influenced by the mean temperature of the year, than by the heat of summer and winter taken separately, it often happens that corresponding mean temperature will not prove a sufficiently accurate guide to forming an opinion upon acclimating; for a plant produced in a country with an exceedingly high temperature in the summer, may be able to bear very severe cold in winter, and yet when transferred to a country where the mean temperature of the year is higher, but in which the winters are milder and the summers cool, may be found incapable of being cultivated. Hence our second inquiry should be directed to the mean temperature of summer and winter, considered respectively of the countries whose productions it is wished to assimilate.

A third condition necessary to render success probable, is an identity of the atmosphere in regard to humidity, pressure, prevailing winds, &c. Unfortunately, the state of our meteorological knowledge is in general not such as to furnish us with exact information on all these points, and therefore the only other method of judging that is open to us consists in a comparison of the Floras of the two given countries. If it should appear that there is an identity or a considerable similarity in their vegetable productions, it is probable that any plant taken from one will thrive in the other; and in proportion as the vegetation of the two countries differs, does the probability diminish of any useful object being attained by endeavouring to exchange their species.

A very slight acquaintance with the character of the countries where the attempts were made to introduce the cultivation of the tea plant is sufficient to account for the total failure of them at Penang. The late Mr. Brown, misled by the unconnected fact, that the shrub stood well the climate of the island, conceived the project of cultivating it on an extensive scale as a commercial speculation. He accordingly established a large tea plantation at his estate of Slugar, and even took pains to procure several Chinese from Canton on purpose to superintend the undertaking. Upon the whole, the plant grew remarkably well, but when the period arrived for commencing to reap the harvest of all the labour, time, and expense that had been incurred, the quality of the produce was found of a very inferior description, and the infusion of the leaf had moreover acquired the very appalling property of a nauseating and even slightly emetic drug; as if the identical variety possessing this effect, which the Jesuit missionaries pretend does exist in certain parts of the Chinese Empire, had unfortunately found its way into Penang, and become the present stock of Mr. Brown's plantation. However, if we recollect that Prince of Wales Island is situated between 5° and 6° north of the equator, that its highest hill does not exceed 2,500 feet in elevation, that in short every feature of the climate is tropical, we cannot be surprised at the result of the attempt; and it is hardly necessary to add, that all further idea of cultivating the plant for the sake of its leaf has been long since abandoned in that quarter.

In Java, similar trials, made under very similar circumstances, have proved equally fruitless, and have in consequence been given up. I am informed that no better success has attended some experiments which were made many years since by the Dutch Government in the southern parts of Ceylon.

About 20 years ago the cultivation of the tea plant was commenced on a large scale at Rio Janeiro, and, as far as concerns the naturalization of the shrub, a certain degree of success attended the measure, but the produce proved to be so bad in its flavour, that the plantation has of late been nearly relinquished. I have had an opportunity of examining a sample of tea produced in the Brazils. In appearance it resembled the finer sort of green tea, but the taste of the infusion was exceedingly bad, and unlike that of the common article. It is needless to dwell on the cause of the failure in this instance.

From what has been advanced in speaking of the general rules that are to be observed in all our endeavours to naturalize the plants of foreign and distant climates, it is obvious, that we cannot expect to succeed, unless we pay strict attention to those laws of nature, in the distribution of the plants on the surface of the earth, which have been traced by the labours of some of the first naturalists and agriculturists; and on the other hand, it must be allowed, that vague and unsatisfactory experiments, such as those were which have been enumerated above, ought not to have any weight in the solution of the problem, whether the tea plant admits of being advantageously cultivated in foreign countries for commercial or agricultural purposes. The time has arrived when this question has assumed a more than ordinary degree of interest, and there exist territories in the British dominions in the East Indies agreeing so perfectly with those of the tea provinces, that no doubt can be entertained of their being capable of producing tea equal to the best kinds ever obtained from China; unless indeed it should be contended, that the plant differs from all others on a point in which the whole vegetable kingdom has been found to agree, and that it forms an exception to one of the most beautiful laws of nature.

The provinces of Kamaon, Gurwal and Sirinore, contain situations corresponding entirely with what we know of those of China and Japan, in which the cultivation of the tea shrub is carried on to the greatest extent and perfection, not only in the characters of soil and climate, but likewise in all the collateral conditions of naturalization pointed out in a preceding part of this report. They constitute the western and northern corner of Hindostan, and are subordinate to the Presidency of Bengal, being situated within 28° and 31° north latitude, and 76° and 81° west longitude, and extending from the plains of the adjoining provinces to beyond the Snowy mountains. In regard to climate and elevation they are extremely diversified, possessing all degrees of temperature from the scorching heat of a tropical sun, or the temperate atmosphere of the tea provinces, to the severe winter of Chinese Tartary, and the eternal snow of the Himalaya, with all the intermediate gradations, and rising from the level almost of the sea to the height of the loftiest peaks in the world. They are watered by the Sutlej and the Ganges, and by the countless tributary streams of both these rivers, and finally, they possess every variety of soil. To all these advantages must be added, the very striking and almost exclusive similarity of their general Flora with that of China and Japan, amounting to absolute identity of species in some instances, and close similarity in many others. I have already had occasion to observe, that a species of camellia grows wild in Nepaul; and in publishing an account of it in 1818, I noticed that a tea shrub was thriving vigorously in a garden at Katmandu, 10 feet in height, and producing plentiful flowers and fruits during the last four months of the year. During my visit to that capital some years afterwards, I saw the shrub, and I ascertained that the seeds of it had been brought from Pekin by the return of one of the triennial embassies, which are sent to China by the Goorka Government.

If we take all these concurring circumstances into due consideration, we may surely entertain sanguine hopes, that under a well directed management, the tea plant may, at no distant period, be made an object of extensive cultivation in the Honourable East India Company's dominions, and that we shall not long continue dependant on the will and caprice of a despotic nation for the supply of one of the greatest comforts and luxuries of civilized life.

London, 3 Feb. 1832. (True copy.)

(signed) *W. H. Macnaghten,*
Secy to Govt of India.

Extract India Revenue Consultations, 12th May 1834.

From the Members of the Tea Committee to *C. Macsween*, Esq., Secretary to Government, Revenue Department.

Sir, 15 March 1834.

No. 4.

In pursuance of the object of our appointment, as communicated in your address of 1st February last, we beg that you will submit to the honourable the Vice-president in Council the following statement of the conclusions at which we have arrived, regarding the points proposed to our consideration, with our suggestions as to the further measures that should be adopted for carrying the wishes of Government into effect.

2. The first question submitted to our investigation is, whether there may not be found within the Company's territories a climate and soil suitable to the cultivation of tea; and to this we are happy to be able to reply, generally, that we think there is good reason to believe that there are parts of the Company's dominions which present such features of climate and soil as would warrant the expectation that the tea plant might be successfully introduced into them with a view to commercial purposes. We admit, however, that further information on this point is still wanting to enable us to point out specifically the situations in which we could with confidence recommend that the experiment should be made. It was scarcely to be expected, indeed, that travellers and other general observers, whose attention had not been particularly directed towards the cultivation of tea, should have collected such detailed information on the subject as would enable us to determine at once on the chances of success or failure in any given place of which the soil and climate were ascertained; while, on the other hand, as the attention of our own statistical inquiries has not till now been directed to this particular subject, we really know too little of our own provinces to be able to form an accurate comparison between them and what is known of the tea districts of China. In the meantime, however, we may safely say, that the proposed experiment may be made with great probability of success in the lower hills and vallies of the Himala range. Next to them, those of our eastern frontier offer the best prospects, and after them the Nilgherry and other lofty mountains in southern and central India.

3. For the facts and reasonings which have led us to the adoption of this conclusion, we would beg to refer to our proceedings, of which copy is annexed, and more especially to the very able and interesting letter of Dr. Falconer on the subject. We may here, however, state shortly, that our conviction is drawn partly from the fact that a certain degree of success has attended attempts to produce tea in other parts of the world, in circumstances of soil and climate far more dissimilar to those of the tea districts of China, as far as we are acquainted with them, than are to be met with in those parts of our provinces to which we have alluded. In China the principal tea districts are covered with snow generally for one month annually; the navigable rivers are obstructed by ice for a still longer period, while the heat in summer is very oppressive, so that the extremes of temperature in the winter and summer seasons must differ by at least 70°. Neither in the Brazils, nor in Java, where the experiment has been tried on a large scale, does the climate at all approach to this description, while one nearly resembling it, in respect to temperature at least, may be found in the northern hills.

4. Another encouraging circumstance is to be found in the fact, that in the mountainous tracts of our northern and eastern frontier, several species of plants are found indigenous, which are also natives of China, and are not met with in other parts of the world. We may instance species of camellia, nearly allied to the tea plant of Abelia, Stauntonia, Ophiopagon, Specatum and Japonicum, Pardathus, Chenensis and Houttugnia cordata; also further to the southeast, Hovena dulcis, Jonicera confusa longifolia, and Chinensia camellia, kissi, and some magnoliacine.

5. Until we can procure specimens, and can effect an analysis of the soil that is found in China to be most conducive to the perfection of the tea leaf, we cannot be said to possess any accurate information on that subject; but as far as the reports of Dr. Abel and other travellers can be taken for our guidance, there is scarcely a hilly tract in India which will not furnish a soil suitable to the cultivation of tea.

6. While, therefore, we would recommend that the experiment should be tried, we think it our duty, before specifying any particular district as absolutely eligible for the purpose, to seek for further information, both regarding our own provinces and the tea districts of China. With this view, we have directed our Secretary to address to several gentlemen, who are believed to be possessed of such local information as may serve for our guidance, a set of specific

inquiries on the subject. A copy of the letter conveying these is annexed, and we doubt not that the replies we shall receive will put us in possession of all the information we can desire, as far as relates to the climate, soil, &c. of our own provinces; so that when more accurate information shall be obtained regarding the tea provinces of China, with reference to the same points, we shall be able to specify with precision the sites that we may think will prove most suitable to the tea plant.

7. Adverting to the very valuable information furnished by Dr. Falconer, regarding that part of the Himalia which lies between the heads of the Ganges and Jumna, in the letter already alluded to, we think it would be of great importance if we could obtain the services of that gentleman in a similar investigation of other parts of the district, especially those lying between the Ganges and Gogra. Dr. Falconer, it will be seen, expresses his willingness to prosecute his inquiries, if he can be relieved from the medical duties of his station.

8. We are aware of the difficulty of procuring the desired information regarding China, from the extreme jealousy of the government of that country; but we hope it will not be found insuperable. We are informed, that for the last three or four years, vessels have been constantly employed by some of the English merchants in trading to the eastern and northern parts of China, and that notwithstanding the denunciations of the authorities, little practica difficulty has been experienced in carrying on commercial intercourse with the people. The Dutch succeeded in procuring several hundred Chinese, and abundance of plants and seed, for their experimental tea plantations at Java; and there are now several Europeans at Canton who have attained such proficiency in the language, that there would be no difficulty in explaining to intelligent natives the nature of the information, and the description of the people required. A recommendation from this Government to the British authorities at Canton would be calculated to procure for Mr. Gordon any facilities or protection that may be found necessary, and we would suggest that he should be furnished with an official letter to that effect.

9. It appears that the best season for planting tea is in March. In order, therefore, that there may be time for acquiring the desired information, and for procuring plants and seed, for engaging Chinese cultivators to carry on the experiment, for bringing them to Bengal, and conducting them to their final destination early enough to save the planting season, we would recommend that Mr. Gordon should be directed to proceed to China as soon as possible, in order to accomplish all those objects.

10. It will, of course, be necessary, that, for this purpose, Mr. Gordon be furnished with a credit to a sufficient extent. We do not think that any large sum is likely to be required, but to prevent disappointment as far as possible, we would suggest that from 20,000 to 25,000 dollars be placed at his command. The accounts of his expenditure, together with proper vouchers, and such explanations as may be necessary, may, on his return, be submitted to us for examination and report.

11. Considering the object of Government to be purely experimental, it will be Mr. Gordon's principal duty to bring round a select, rather than a numerous, body of planters; men qualified to conduct every operation connected with the production of good tea, from the selection of a proper site for a plantation, to the gathering of the leaf, its preparation, and packing; together with the construction and manufacture of every article required in those various steps. After the practicability of producing tea fit for commercial purposes shall have been ascertained, it may safely be left to the enterprise of individuals to pursue the business as an object of speculation.

12. Confined to the purpose of mere experiment, we think the number of Chinese to be brought round need not exceed 50; and that it would be better to rest content with even a much smaller number than risk the loss of a season in an endeavour to procure so many as 50.

13. The particular terms on which the planters are to be engaged must depend on circumstances, and must, therefore, be left in a great measure to Mr. Gordon's discretion. He will, however, take care to let those who are

engaged understand distinctly, as desired by Government, that if they succeed, they will receive a certain amount of gratuity beyond their subsistence money or wages.

14. To obviate the inconvenience of our Secretary's departure for China before the requisite information on this site shall have been collected and digested, our associate, Dr. Wallich, has very kindly come forward with the offer of his gratuitous services as acting secretary to the committee during Mr. Gordon's absence. We need scarcely add, that if approved by Government, we shall be most happy to avail ourselves of this handsome offer, emanating, as it does, from one so eminently qualified for the duty he proposes to undertake.

15. We take this opportunity of requesting the sanction of Government for charging in a contingent bill, to be countersigned by the chairman, such office expenses as may be considered unavoidable; as in the employment of a writer and peon, and for printing and stationery. A writer and peon have actually been engaged in the business of the committee since the beginning of February, the former at 30 rupees, and the latter at 6 rupees, per mensem.

We have, &c.

(signed) *Js. Pattle.* *Rob. Wilkinson.*
J. W. Grant. *R. D. Colquhoun.*
R. D. Mangles. *N. Wallich.*
J. R. Colvin. *Radhakunt Deb.*
C. E. Trevelyan. *G. J. Gordon.*
15 March 1834. *C. K. Robison.*

(True copy.)

(signed) *W. H. Macnaghten,*
Secretary to the Government of India.

EXTRACT INDIA REVENUE CONSULTATIONS, 12th May 1834.

No. 5. **PROCEEDINGS** of the Committee appointed by Government for the introduction of the Tea Plant into the Company's Territories.

Meeting of 13th February 1834.—Present:—J. Pattle, C. Macsween, J. W. Grant, J. R. Colvin, C. K. Robison, G. J. Gordon, Esqrs.; Sir R. Colquhoun, Bart.; Dr. N. Wallich, and Ram Comul Sen Baboo.

Moved by Mr. Macsween, and resolved unanimously, that Mr. Pattle take the chair.

Read two papers which accompanied the letter of Mr. Secretary Macsween, communicating the appointment of this Committee for the purpose specified; viz. proposition to the Honourable the Court of Directors to cultivate Tea upon the Nepaul Hills, and such other parts of the territory of the East India Company as may be suitable to its growth. Understood to have been written by John Walker, Esq.

2. Observations on the Cultivation of the Tea Plant for commercial purposes on the mountainous parts of Hindoostan, by Dr. N. Wallich. The Secretary also obtained leave to read an extract from Du Halde's description of China relative to the Tea plant.

Extracts from the third volume of De Guigne's Voyages regarding the Cultivation of the Tea Plant, and the Soil and Climate of the provinces of its growth.

Extracts from Abel's Journey in China, relating to the same subject. An Extract from M'Culloch's Dictionary of Commerce on the subject of the cultivation of Tea out of China.

Extracts from the Encyclopedia Méthodique. Agriculture. Vol. 6, Article, Thé.

Extracts from Mr. Marjoribanks's Evidence before the Select Committee of the House of Commons.

Extracts from MS. Notes furnished by Mr. Reeves, late inspector of Teas in China, to Dr. Wallich.

Notes from Dr. Lumqueen, of Calcutta, to Mr. Gordon, on the seasons of the Tea provinces in China.

Extracts relative to the climate and soil of Kumaon, from Mr. Traill's account of that province, published in the Asiatic Researches, volume 16th; and

Extract from the late Captain Herbert's account of Darjeelinge.

The places specified in the above several publications and papers were pointed out on Du Halde's Map of China, and Arrowsmith's Map of India.

From the information thus brought to the notice of the Committee, it appeared that the best tea is said to be produced in the provinces of Keung-Nan and Fokien, and between the 27th and 31st degrees of north latitude, at a considerable distance from the sea, where the face of the country is hilly and even mountainous, but at no great elevation on those hills, in their southern aspect, where the cold of winter descends to the freezing point, and snow falls, but does not lie long on the ground, where rain prevails in March and April, and falls heavily in July and August, and where the soil is light and gravelly, and formed of disintegrated rocks of sand and granite.

Read the following Minute by the Secretary:—

If we should succeed in rearing the tea plant in India of a quality, and in quantity, to satisfy the English market, the advantage to this country would be an addition to its wealth, that, after making every allowance for the fall in price that may be expected to follow the opening of the trade with China, may be estimated at from two to three millions sterling per annum.* Bengal would thus become possessed of an additional staple for export nearly equal in value to that of the aggregate mass of indigenous articles now shipped to England, and this without displacing a single production useful either for nutriment or in the arts. The sandy and now barren slopes of rugged mountains will, in this event, become seats of agricultural industry, and sources of commercial riches unknown to the more fertile plains of the Ganges; and our Indian fellow-subjects will thenceforth enjoy the tribute hitherto paid by Europe to their uncourteous eastern neighbours for the most innocent and refreshing of all luxuries.

Other nations, though not possessing the same motives in half the force with which they apply to England, have gone before her in the attempt to deprive the Chinese of their monopoly of the tea leaf; their experiments are alike instructive in their failure or in their partial success, and we should profit by them accordingly. They teach us that the plant will grow well, will put forth its leaves and flowers, and perfect its fructification, in situations very widely differing in many material respects from those in which it best thrives in its native country. It has been reared in Carolina, Corsica, Brazil, Penang, St. Helena and Java. Mounsieur Bosc, treating of this article in the Encyclopedia Méthodique, asserts, that he has tried the leaves of tea plants cultivated in the environs of Paris, and has found them superior to most of the teas of commerce. He states that Brassonet, and after him Volney, reared tea plantations in Corsica that succeeded as well as could be desired; but which were ruined by malice. At Rio Janeiro it grew well, even in a garden close to the sea, till the Chinese, who had been employed in the cultivation, were, as I am informed, hunted out of the plantation by the far-famed Don Miguel, who exercised his hounds in this congenial sport. The produce subsequently prepared has been tasted by Dr. Wallich, and pronounced by him to be bad †; that of the tea shrubs at Penang was still worse, the leaves being thick, hard and leathery, and the beverage produced from them absolutely nauseous. In Java, the result of an experiment to cultivate the shrub, on spots of considerable elevation, has been more successful.

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* 28,230,000 lbs. sold for 3,286,000 *l.* 1828.
27,411,000 lbs. sold for 3,024,000 *l.* 1829.

† Mr. Walker, however, gives a favourable report of tea produced at St. Paul's, in latitude 21 south.

Mr. Wilkinson, a member of our committee, has seen specimens of the Java tea, which appeared tolerably good. Now, all authorities concur in stating, that the plant which furnishes those qualities of tea which are suited for exportation grows in China between the 27th and 31st parallels of north latitude, in situations remote from the sea, where the face of the country is mountainous, and where the cold of winter is considerable, while the sun is extremely powerful in summer. Although, therefore, the experiments referred to have satisfactorily proved the natural vigour of the plant, which can thrive in such a variety of climate, they are absolutely inconclusive in regard to the main question, whether the better qualities of tea can be produced elsewhere than in China; for it will be observed, that in not one instance has the site of the experiment corresponded in the most essential points with the *locale* above described; in not one has it been exposed to the same alternations of temperature, in a similar soil, under a similar pressure of the atmosphere, and equally remote from the influence of sea air. The cold at Rio Janeiro is never equal to the ordinary cold of winter even at Canton; and Penang and Java are within 6 or 8 degrees of the line, so that though at considerable altitudes in the latter island an equal and temperate atmosphere may exist, this does not answer the condition of the climate found to be most congenial to the tea plant. We ought, therefore, to feel rather surprised at the degree of success that appears to have been attained at Java, than disappointed or discouraged by not finding it more complete. Considering that the leaves of plants perform vital functions analagous in some respects to those both of the organs of respiration and of digestion in animals, we can easily understand how much their texture and qualities must be liable to be influenced by soil and climate. We are informed by Du Halde, that even in China the leaves produced from tea plants growing on a clayey soil, and in low situations, are of very inferior description; and we have analogies in the vine, tobacco, cinnamon tree, rhubarb, poppy, and many other familiar instances of the variations caused in the aroma and other qualities of plants, by differences of soil and climate, which do not seem to affect in any remarkable degree their appearance, or their general healthiness and vigour. Our hopes of success must, therefore, mainly rest on the discovery, within our own territories, of localities corresponding closely in point of soil and climate with those of the best tea districts in China. I know of no part of India in which these are so likely to be met with as amongst the Himalia Mountains; even there, however, we may possibly meet with disappointment; for it is not to be concealed, that a lofty wall of mountains, separating a vast alluvial plain on the one hand, from the interminable table lands of Tartary on the other, presents a very different aspect, and is likely to be very differently affected in point of temperature and of moisture from hills centrically situated in a country nowhere presenting wide tracts of level land, either at low or considerable altitudes. My fears, in short, are turned towards the effects of the rainy season, which in our present ignorance of the quantity of rain which falls during the same months in the interior of China, may, I apprehend, be found deleterious from excess of moisture. Fogs, too, are exceedingly prevalent at the same season, at most of our hill stations in that range, a circumstance easily accounted for by the peculiarity of their positions above adverted to, and which, though it may exist in the tea provinces, is not so likely to be prevalent there.

The object proposed, however, is far too vast in importance to be abandoned on mere surmise. It might be proper, therefore, in the first instance, to take a general survey of the Himalia stations. With reference to those points which we know or believe to be of consequence to the success of our object, and as the books and authorities we possess do not afford all the details we require regarding the climate of the tea provinces in China, it is desirable that before incurring any considerable expense in experiments of doubtful issue, we should procure such accurate information respecting those districts as might afford tolerably sure grounds for determining the sites to be selected as most likely to be found suitable to the plant, if any such exist in India. With this view I would suggest that, without subjecting Government to any extra expense, I should be permitted to proceed at once to Shuharunpore, and thence visit the vallies of the Sunnuggur and Deyra Dhoon districts, in order to satisfy myself by actual inspection, and by information procured on the spot, how far they afford situations analagous to the description of those of the Chinese tea provinces, in respect of both soil and climate. By comparing the knowledge thus acquired, with further information to be obtained in China, I should be able to judge whether those districts, or any others of which we have descriptions that can be depended upon, would be the best to which to conduct the tea planters with their plants on their first arrival from China; always leaving it to them to select the particular positions deemed most favourable for tea planting. Should this proposal be approved by the Vice-President in Council, I would lose no time in setting out on my journey, with the intention of being again in Calcutta before the Governor-General's return from Madras, as I learn from Mr. Wilkinson that there would be no advantage in reaching China before the month of June.

It is of importance that the plants and seeds should be conveyed to their destination as quickly as possible; and the shortest passages from China are made in October and November. This, too, would be the least dangerous season for the transportation of the plants from Calcutta to the hills where they are to be tried, as either the hot winds or rains of Bengal would probably prove fatal to the shrub.

The object contemplated by Government being one of great national importance, too much circumspection cannot be employed in attending to every circumstance likely to influence its success.

Resolved, With regard to the proposal contained in the concluding part of the Secretary's Minute, that the Committee deem it more expedient, with reference to the late period of the season, and other circumstances, that he should, instead of visiting the Himalia stations himself, obtain the best information procurable from intelligent persons who have resided on the hills, relative to their soil and climate, so as to enable the Committee to form some conclusion as to their relative aptitude for the culture of the tea plant. That with this view a set of queries be prepared, which, when approved by the Committee, shall be printed and forwarded to such parties as above mentioned.

Resolved, That with reference to the foregoing directions, application be made to Government that correspondence relative to the business of the committee be exempted from charges of postage.

Resolved, That Government be applied to also for permission to charge, in a contingent bill, countersigned by the chairman, the secretary's incidental expenses, including a writer at rupees 30 per month, a peon at rupees six a month, stationery and printing charges. That the tea plant now growing in the garden of the Horticultural Society be examined, and, if found genuine, that steps be taken to have it removed to a more genial climate.

(signed) *J. Pattle*, Charman.

(True copy.)

(signed) *W. H. Macnaghten*,

Secretary to the Government of India.

EXTRACT INDIA REVENUE CONSULTATIONS, 12 May 1834.

EXTRACT of a Letter from Dr. *Falconer*, Civil Surgeon, in charge of the Botanic Garden at Saharunpore, to the Secretary of the Tea Committee; dated Saharunpore, 22 February 1834. No. 6

THE most productive tea districts in China, according to all accounts, lie in the maritime provinces of Fokien, Kyan Si, and Kyang-Nan, chiefly between 27° 30′ and 31° north latitude, and longitude 112° to 117°. One kind, lu-ngan-cha (a superior sort of hyson), is said by the Jesuit missionaries to be produced so high north as 38°, and east longitude 100°; and another, peeul-cha, brought from the province of Yunnan, is said to be procured from mountains in the latitude of 25°, on the frontiers of Ava and Pegu. The tea plant is grown on the sloping sides of mountains or in valleys, but chiefly at the foot of mountains. It is also produced in level tracts, but less advantageously. Besides the explicit information given by Dr. Abel, from actual examination of one district, it is sufficiently certain, that the rock formations in most of the tea districts are chiefly primary, from their being productive of metals, which are only found in such formations. The best tea soils are said to be light, gravelly, sandy, and whitish (blanchatre, in Du Halde, probably calcareous), with little accumulation of vegetable mould. Le Comte says, the best tea is produced in gravelly soil, the next best in a light or sandy soil, and the inferior in a yellow (jaune, probably clayey) soil. It is admitted on all hands that the tea plant thrives best with an open exposure to the south.

The climate of the whole of China is remarkable in respect of temperature, and it must be duly weighed when the acclimatization of any of its peculiar vegetable productions in another country is concerned. Latitude alone is here no guide, the mean annual heat being much under what is observed in most other countries at an equal distance from the equator. Pekin, latitude 39° 54′, nearly at the level of the sea, has a mean annual temperature of 54.86°, calculated for the latitude theoretically by a formula* of very general application, we get 62.5°, a difference of about 7.5° above the observed mean temperature of the year. But it is in excesses of the summer and winter seasons that the climate is most remarkable. It has a winter temperature of 26.42°, or nearly that of Upsal, latitude 59° 51′, (20° of north latitude), and a summer heat of 82° 58′. Its winter climate is that of Copenhagen, and its summer heats are as scorching as at Cairo. Between the mean temperature of the hottest month in summer and the coldest of winter, there is a difference of not less than 59° of Fahrenheit; a climate of excesses almost without parallel in any part of the globe, except Quebec in Canada. This condition, which is owing to the vast accumulation of land extending from the Arctic Pole, or through Eastern Asia, to China, is not confined to the northern provinces; it extends to Canton within the tropic, but modified there by the equalizing effect of a non-tropical ocean about it. The mean annual heat of Canton, latitude 22° 10′, calculated theoretically for this latitude, gives 75° 5′ Fahrenheit. Reduced from a register in the Transactions* of the Medical Society of Calcutta, the observed mean temperature is 73′ nearly. The mean of the coldest winter month is 54′; of the hottest summer month, 85° 5′. I am not aware that any determination has been made of the climate in the provinces between Pekin and Canton, and I have not access to the later writers on China: but an approximation may be made to the temperature of tea districts from the facts known regarding Pekin and Canton. Assuming that the most productive tea districts extend from 27° to 31° north latitude, and taking 29° as the central tract, by calculation for this latitude we get 71° Fahrenheit for the mean annual heat. At the level of the sea, assuming further, that the refrigerating influences on the climate of China, which have been seen to be 7° 5′ at Pekin, and 2° 5′ at Canton, amount to 5° Fahrenheit in the parallel of 29° latitude, and deducting this from 71°, we get 66° for the mean annual temperature. The elevation of the tracts of tea cultivation above the sea will form another abatement on this sum. But on this point I have no grounds to form anything like a precise conclusion. It is stated by Du Halde, that the tract from which one of the finest green teas, long-lo-cha, is brought, is a mountain in the district of Whey-choo-foo, of the province Kyang-Nan, of no great height or extent (peu de hauteur et d'etendue). Supposing that the tea cultivation reaches the height of 3,000 feet above the sea, and making a reduction for this altitude, the resulting mean temperature might be a range of 56° to 61°. What the range of temperature between the cold of winter and the heat of summer is, it may be difficult to say. The heat of summer cannot be less than at Pekin, which is 10° higher north: and it has been seen that the difference between a summer and a winter month at Canton, within the tropic, is 30°, and at Pekin, north latitude 40° 59′ Fahrenheit; it may therefore be assumed, that in the latitude of 29°, the range of the thermometer from the mean of summer to that of winter is not less than 40° Fahrenheit.

In regard of the moisture of the climate, there is little precise information, and what is known is chiefly as confined to Canton. The rains are not regularly periodical, as is the case on this side of the continent of Asia, within the same parallel: rains seem to fall all months of the year, although heaviest from August till October. The mean fall of rain, as entered in the above quoted Canton Register, is, for 1829, 42 inches; 1830, 50 inches; 1831, 70 inches: average of the three years, 56 inches. In the tea districts the quantity must be less, excepting at the greater elevations. At the northern limit snow falls abundantly during the winter. At the southern limit, in the province of Canton, where large quantities of the inferior teas are produced, snow is never seen. It is probable that it falls occasionally in the centre districts on the higher elevations.

The circumstances of climate, therefore, in regard to temperature and moisture,

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* Mean temperature, 81 cos. lat.

* Vol. 6, by Mr. Pearson.

ture, under which the tea plant is cultivated in China, may be stated thus: that the tea is produced over an extent of country where the mean annual heat ranges from 73° to 54° 5′; where the heat of summer does not descend below 80°, and the cold of winter ranges from 54° to 26°; where the difference between summer and winter heat is, on the northern limit, 59°, and on the southern 30° Fahrenheit; that it is cultivated in highest perfection where the mean annual heat ranges from 56° to 64°: that rain falls in all months of the year; and that the moisture of the climate is on the whole moderate.

The foregoing remarks will apply in a great measure to Japan, in some parts of which excellent teas are produced. Without entering on details, it may be sufficient to say, that at Nangasoki, the temperature of the year is 6° 8′: the greatest observed heat in summer, 98°: the temperature of January, the coldest month, 35°; that rain falls periodically about midsummer; that in the higher parts of the country heavy snow falls in winter, with intense frost: that the mean temperature of the summer is 83°, and that of winter 39°.

It may now be worth considering the countries into which the tea plant has been introduced, and failed.

At Penang, close to the line, with a mean annual heat of 80°, an equable climate the whole year round, and an excessive fall of rain, amounting to nearly 80 inches for the year, the climate is in every respect so much in contrast with that of China, that the tea could not be expected to be grown. The same is the case with St. Helena, where, although the mean heat for the year is 73°, the thermometer does not fall in winter below 55°, and the climate is moist and cloudy. Of the causes of failure in Java, I am less able to judge, but they are likely to be found in its low latitude, 6° 9′, and the excessive moistness of the climate, and the great fall of rain during the year. At Rio Janeiro, tea was tried under a colony of Chinese, and failed, perhaps from being within the tropic, and too great heat, with a moist and generally equable climate. It has been twice attempted by the French in the Carribee Islands. The first occasion, in Martinique, was a failure: I do not know the result of the second: but a latitude any where between 11° and 19′, with the kind of climate consequently implied, gives little chance of success.

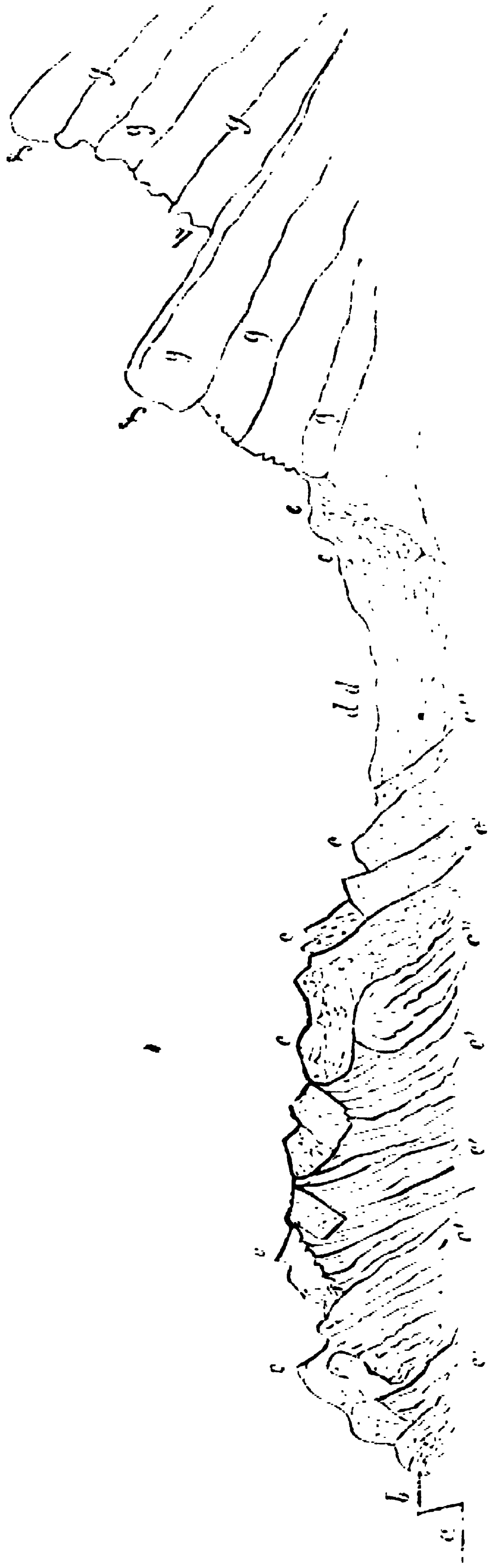
There is, perhaps, no part of the Company's territories in India which supplies all the conditions of tea districts of China in respect of climate: but there are situations which approach it so nearly, as strongly to bear out the conclusion, that tea may be so successfully produced in this country as to be an object of high commercial importance. It appears to me that this can be expected in no part of the plains of India. The mean annual heat of the climate from 30° north down to the parallel of Calcutta is much beyond that of the tea cultivation in China. We have, in addition, an excessive summer heat, with either hot winds or a close scorching air during the day, a barely temperate winter, cold and heavy periodical rains. We certainly get some Chinese fruits, such as the leechee, the loquat, and the wampee to grow, but the tea plant appears to require a greater cold to thrive in. It has been seen that the annual heat of the southern limit of the tea cultivation in China, assumed to extend to Canton, is 73°* Fahrenheit. At Saharunpore, which may be considered as at the northern limit nearly of the plains of Hindoostan, 8° of latitude higher, and 1,000 feet above the sea, the mean temperature of the year is 73° Fahrenheit, the temperature of June is 90°, and of January 52°.

In the Himalia Mountains the case is widely different, excepting periodical rains; here all the conditions of a temperate climate are found, and here, above all parts of India, we may look for the successful cultivation of tea. Our not possessing mountain territory below 29°, may alone exclude the consideration of the fitness of the southern tract. My personal knowledge of the hills is chiefly confined to the tract between the Ganges and Jumna. In consequence of being tied to Saharunpore, from having the medical duties of the station to attend to, in addition to the botanic garden, I have not been able hitherto to see much of the mountains; but as the rock formations, and the configuration of the hills, are the same along an immense tract, the remarks which I have to make will apply very generally to the hills.

The Himalias have a direction running from north-west to south-east. They consist, on this side of the snowy range, chiefly of primary rocks, inclined at a considerable angle. The dip of the strata is to the east of north, and their abutment to the west of south. On the flank of the great range, there is a line of low hills, the Sewalie, which commence at Rooper on the Sutlej, and run down a long way to the south, skirting the great chain. In some places they run up to, and rise upon the Himalias; in others, as in this neighbourhood, they are separated by an intermediate valley. Between the Jumna and Ganges they attain their greatest height, which Captain Herbert estimates at 2,000 feet above the plains at their foot, or 3,000 above the sea; Saharunpore about 1,000 feet above the sea. About 25 miles north are the Sewalie hills; they are here six or seven miles wide. To the east of the Ganges, and west of the Jumna, they gradually fall off. They have the same direction with the great chain, and agree generally in dip, their slope being towards the north, and abutment to the south. They rise at once against the plains with an abrupt mural front. They are serrated across the direction, forming a succession of nearly parallel ridges, with a steep face on one side, and a slope on the other. The strata are inclined at an angle of 25° to 30°. They are of recent tertiary or alluvial formation, and consist of friable sandstone or gravelly conglomerate, agglutinated by a calcareous cement, containing subordinate beds of clay. The upper strata are entirely gravel. Beyond these hills lies the valley of Deyrah, 1,200 or 1,400 feet above the sea, and then the great chain of the Himalais. The opposite rude sketch will perhaps give you an idea of the whole better than description; the distances are not in proportion in the section.

I regard these hills as an up-heaved portion of the plains at the foot of the Himalias, and that they are formed of the debris of the mountains, washed down by streams and other natural causes. They are covered with vast forests of saul, toon, and fir, and are uninhabited.

The soil of the Sewalie Hills, and of the valley of the Dhoon, takes the character of the rocks. It is dry, sandy or gravelly, with a considerable quantity of calcareous matter, and it appears to me to possess the characters indicated for the tea districts in China.



(a) Level of the sea at Calcutta.
(b) Level of Saharunpore, 1,000 feet above the sea.
(cc) The Sewalie Hills.
(cc') The strata of sandstone and conglomerate.
(c'c') Strata of gravel.
(dd) The valley of the Dhoon.
(ee) Strata of the Sewalie Hills, in some places rising on the Himalais.
(ff) Outer ridges of the Himalais.
(gg) Primary strata.
(h) The valleys or hollows between the ridges.

The great chain of the Himalais rises in a ridge with an abrupt steep face against the plains of about 6,000 feet in height. There is then a slope from the crest of the ridge towards the north. This is the general character of the Himalias; the mountains on the side of the snowy range consist of a series of nearly parallel ridges, with intermediate valleys or hollows. They throw off spurs in all directions into the hollows, forming subordinate valleys. There is nothing like table-land (perhaps in the whole of the mountains, with the exception of Nepaul), and the valleys are more broad, wedge-shaped chasms, contracted at the bottom to a mere watercourse, than anything else. In fact the ridges and intermediate valleys, as a general law, form a series of salient and re-entrant angles, as seen in the sketch; in consequence, the quantity of level or nearly level ground to be met with is most inconsiderable. From the dip or slope being towards the north, and the abutment to the south, steep, the great mass of vegetation has a northern exposure, and the southern faces of the mountains are greatly naked.

The formations are primary; the first towards the plains consist of vast strata of limestone lying in clay slate, crowned by slate, grey warke or sandstone. Beyond the limestone tract gneiss clay, slate, and other schistose rocks occur. Granite, so far as I know, is not found in the outer ridges; it occurs in the mountains nearer the snowy range. I have not gone that length, and have not yet seen granite in situ. The igneous rocks which have been concerned in the upheavement of the outer tracts are of the green-stone trap series, and are very generally met with in dykes intersecting and rising through the regular strata. The formations have a remarkable feature; the strata are in all directions fractured or comminuted: the slaty rocks are broken into small fragments, as if they had been crushed, and the limestone rocks are vesicular or cavernous, and broken up into masses.

The arrangement and nature of the soil take their character from the rocks. From the high angle at which the rocks are inclined, and the northern direction of the slope, the slope is chiefly accumulated on the northern sides, where the vegetation also is. From the prevalence of schistose strata and limestone the soil under-lying the vegetable mould is clayey and calcareous, or limestone gravel; there is little sandy soil or sandy gravel. From the extreme richness of the vegetation, undisturbed for ages, and the moisture of the climate, there is usually a great accumulation on the northern slopes of vegetable mould. On the southern faces the great steepness leaves little room for the accumulation of soil: where it occurs it is in patches, and consists of clays or limestone gravel mixed up with vegetable mould. There is here also little sandy soil. Towards the crest of the slopes the soil is usually dry, from the moisture running speedily off, but lower down, and where the ground is tolerably level, the soil is quite damp, and perhaps it is rarely dry in the most parching seasons.

Cultivation is laborious and difficult; from the absence of table-land, and the angular and contracted shape of the bottom of the valleys, there is little or no level ground; the most favourable slope is taken, and besides the usual tilling of the ground, it has to be divided into patches, which are built up into inconsiderable terraces, rising the one above the other like the steps of a stair. These circumstances might make the cultivation of tea scattered, and prevent it from being produced in any great quantity on one spot.

The climate of the Himalais is decidedly damp. The periodical rains commence about the middle of June and continue till the end of September; they are greatly heavier than in the plains in the neighbourhood, and continue at times for many days without intermission. Occasional rains occur in most months during the year. The mean annual fall has been estimated by Mr. Traill, commissioner of Kumaon, at Hawulbagh, near Almorah, about 4,000 feet above the sea, and lat. 29.30, at from 40 to 50 inches; but this, I imagine, is too little. From the middle of November till the end of February occasional falls of heavy snow take place down to the level of 6,000 feet above the sea on the outer ridge of the mountains, and lower down within the hills perhaps to 3,500 feet. It is a great cause of the richness of the vegetation and dampness of soil. In the poorer tracts (such as the district of Jounsar), if snow does not fall during the winter the subsequent crop invariably fails.

From the end of February till the middle of June, and from October till the middle of November, the sky is generally clear and unclouded; during these months, in consequence, very heavy dew is deposited during the night, so that as a general fact it may be stated, what with rain, snow, and dew, that moisture in one shape or other falls abundantly every unclouded day during the year: and the cloudy days without rain do not amount to a month in the year.

In respect of heat, the climate of the Himalias, lat. 29.30, at an altitude of 4,000 feet above the sea, is temperate; the hot winds cease, and the vegetation takes on an European character. In those parts of the mountains, such as Mussooree,

sooree, where the outermost ridge rises at once from the plains to the height of 5,000 or 6,000 feet, the climate is perhaps equal to anything known. About three hours after sunrise the heated air of the Dhoon valley, particularly during the hot months, rises and establishes a current upwards; it gets rarified and consequently cooled, and causes a cool fresh breeze across the hills towards the interior, which diminishes the effects of intense solar radiation at this season. It is as regular as the sea-breeze of a tropical island. At Mussooree, 6,000 to 7,000 feet above the sea, the mean annual heat is 57°; the hottest months, June and July, have a mean temperature of 67°; the coldest months are December and January; the mean heat of January is 42°. At Hawulbagh, below Almorah, nearly 4,000 feet above the sea, the mean temperature for the year, deduced from Mr. Traill's Register,* is 60°, that of January is 41°, and of July 70°, giving a range of 39° between the coldest and hottest months of the year. Between the temperature at seven A. M. in January, and two P. M. in July, there is a difference of 53°. On one occasion the thermometer stood at 18°, showing a range not less than 60° between the greatest observed extremes of summer and winter.

In the valley of the Dhoon, I am not aware that any register has been kept of the temperature; but I am inclined to consider the average annual heat is about 68°, or 5° lower than Saharunpore. Generally speaking, it may be stated of the climate, that more rain falls than in the plains, but less than on the mountains; that the hot winds of the plains are shut out by the lower hills (Sewalic) on the S. W. of the valley, although a particularly hot wind is felt; that the cold of winter is below that of the plains in the neighbourhood, and that the cold weather commences earlier and lasts longer.

From what has been mentioned above, it appears to me that there is a great similarity between the climate of the tea districts of China and that of the lower heights or the outer ridges of the Himalias, in the parallel of 29. 30: the chief difference is, perhaps, more moisture in this country. How extensive a range of temperature may be had, will be seen by collating, in a tabular form, the temperature of three places already given, as below:

	Annual Mean Heat.	Summer Heat.	Winter Heat.
Saharunpore, 1,000 feet above the sea plains	73	90	52
Hawulbagh, 3,887 feet, Himalias - -	60	70	41
Mussooree, 6,500 feet - - ditto - -	57	67	42

By varying the altitude, the temperature could be graduated to any point that might be desirable; and as temperature is the mean condition, I am of opinion that tea might successfully be cultivated in this part of India. It is an experiment which can be conducted properly only by a government; on an extensive scale the risk would be too great for private speculation, and on a small one, the advantage too inconsiderable. There remains now to consider what situation is best adapted for a trial. Besides fitness of climate, there are other circumstances to be taken into account affecting a favourable experiment; such as abundance and cost of labour, facility of communication, and distance from the plains. Three stations in the mountains within the Company's territories might be thought of, Almorah, Subathoo, and Mysooree. The hills about Almorah, although favourable enough in climate, are separated from the plains by a broad belt of tyraee, which is only passable at certain seasons of the year, and it is so unhealthy as to be unsafe at all times to pass through; the population in the neighbouring hills is scanty, and a great portion of the tyraee is uninhabited; were the tea cultivated, besides a permanent establishment at the season of gathering, a number of additional hands would be required, which could only be advantageously done where labour was plenty and cheap. On these accounts I am inclined to think that Almorah would not be an eligible district to make a trial in.

Of Subathoo I cannot speak from personal observation, but I imagine it would be a good situation. It is immediately over the plains; there is some level ground about it; there is no tyraee jungle in front of it, and the country at the foot of the mountain is inhabited. The valley of Pinjore, in the neighbourhood, is populous. The climate is like that of corresponding heights on the hills north of the Dhoon.

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* Transactions, Asiatic Society, vol. 16.

I am inclined to think the best ground would be near Mussooree, on the hills north of the Dhoon. The district lies between the Jumna and Ganges, which are navigable till within a few marches from the foot of the hills; the communication with the plains is open almost all months of the year, and the valley of the Dhoon is inhabited. There might be had here, within a short distance, a great variety of situations in respect of soil, climate, and exposure. I imagine that the best position would be a tract on the southern face of the outermost ridge, situated from 3,000 to 6,000 feet above the sea, or where the hot winds cease, up to the limit of winter snow. On the northern slope it should be at a lower level, and perhaps here the finer sorts of tea might be produced. The valley of the Dhoon has a gravelly or sandy soil, which appears closely to resemble what is described as best for the tea cultivation in China; and the climate is such, that it is probable that the inferior kinds of tea, such as are grown in the province of Canton, forming, perhaps, a large proportion of the article exported to Europe, if not superior teas, might be produced in it. In some places, as at Naher, the rocks and soil of the Sewalic-hills formation, rise upon the Himalias to the height of 3,000 feet; and in situations of this sort all the most favourable conditions of soil and climate are combined.

I shall conclude by stating, compendiously, the opinions in this letter:

1st. That the tea plant may be successfully cultivated in India.

2d. That this can be expected nowhere in the plains, from 30° north down to Calcutta.

3d. That in the Himalia mountains, near the parallel of 30° N., notwithstanding some circumstances of soil and moisture of climate, the tea plant may be cultivated with great prospect of success; that a climate here may be found similar in respect of temperature to the tea countries in China; that in the direction and great slope of the hills, the absence of table-land or elevated valleys, and the contracted figure of the existing valleys, are the chief difficulties in the way of cultivation, which may prevent tea from being produced in great quantity on any one spot.

4th. That the most favourable ground for a trial is a tract on the outer ridges, extending from 3,000 feet above the sea, or the point where the hot wind ceases, up to the limit of winter snow.

5th. That in the valley of the Dhoon, if not the better, the inferior sorts of tea might be produced.

If there is any other information that I can afford to you, or the Committee, shall be happy to give it.

My dear Sir, &c.

Botanical Garden, Saharunpore, (signed) *H. Falconer.*
22 February 1834.
To G. J. Gordon, Esq., &c. &c. &c.

(True copy.)
(signed) *W. H. Macnaghten,*
Secretary to the Gov^{t} of India.

EXTRACT INDIA REVENUE CONSULTATIONS, 4 August 1834.

From the Members of the Tea Committee to *C. Macsween*, Esq., Secretary to Government, Revenue Department, dated 23 July 1834.

No. 2.

Sir,

WE beg leave to report[*], for the information of Government, that Mr. Gordon left Calcutta last month for China, in the Water Witch, and to enclose copy of the instructions with which he was furnished previous to his departure.

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[*] Letter from the Tea Committee to G. J. Gordon, Esq., dated 20th May, and two memorandums of Dr. Wallich.

2. In order to lose no time in making the requisite preparations for the reception and cultivation of the supply of tea plants and seeds, which are expected to arrive from China before the end of the year, we have deemed it necessary to take measures for the prompt establishment of several small nurseries in our north-western mountainous provinces. With this view we have addressed letters[*] to the Commissioner in Kumaon, and the superintendent of the botanic garden at Saharunpore, of which the enclosed are copies. We have thankfully accepted Mr. Traill's offer of his aid, and have requested him to undertake the accomplishment of the above-mentioned plan within the province, and under his charge. At his recommendation, and with the concurrence of the superintendent of the botanic garden of Calcutta, we have availed ourselves of the services of Mr. Robert Blinkworth, a very able and steady person, who has been for many years in the employ of the botanic garden here, as plant and seed collector, and who, from his long residence in Kumaon, has become well acquainted with its localities and productions. We understand that his allowances have lately been reduced to only 48 rupees a month, which we recommend may be increased to 100 rupees, including travelling charges.

3. It will be seen from the enclosed copy of a letter from Doctor Falconer, dated the 4th instant, that he has already entered the hills to the northward of Saharunpore on the proposed journey in behalf of our committee. As most of the points on which he wishes to have our specific directions have already been anticipated in our letter of instructions, in which we requested him to confine his present labours to the selection of suitable sites for some nurseries in the Gurwhal and Sirmone hills, we have only now to solicit the favourable consideration of the Honourable the Vice-president in Council to paragraph 5 of Dr. Falconer's letter, relating to his personal allowances and travelling charges, and to recommend that the civil authorities on his route may be requested to aid that officer in the attainment of the object of his journey.

We have, &c.

(signed)
J. Pattle.
J. W. Grant.
C. Macsween.
C. E. Trevelyan.
C. K. Robison.
J. R. Colvin.
Robt. Wilkinson.
Ram Comul Sen.
R. D. Colquhoun.
R. D. Mangles.
Radakhan Deb.
N. Wallich.

(True copy.)

(signed) *W. H. Macnaghten,*
Secretary to the Government of India.

Calcutta, 23 July 1834.

Extract India Revenue Consultations, 4 August 1834.

From *N. Wallich*, Esq., M.D., Officiating Secretary to the Committee of Tea Culture, to G. W. Traill, Esq., Commissioner in Kumaon, dated 28 June 1834.

Sir,

THE Committee of tea culture being desirous of establishing some nurseries in the mountainous province of Western Hindostan, bordering on the Himalaya, for the reception of the plants and seeds which they expect will arrive from China before the end of the year, are anxious to avail themselves of your valuable aid, so politely offered to them in your letters to Sir Robert Colquhoun and to their Secretary. With this view I am directed to address you on this occasion, requesting that you will have the goodness to undertake the inquiries which may appear to you necessary to carry into effect the object in the province under your charge.

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[*] To G. W. Traill, Esq., and Dr. Falconer, dated 28th June.

2. In order to apprise you of the views which the committee entertain relative to the conditions of soil, climate, &c. required for the successful cultivation of the tea shrub, I am desired to send you the accompanying extract, paragraphs 2 to 8, from their report to Government, dated the 17th March. It is necessary, however, to add, that the accounts which the Committee have subsequently been able to gather, have all tended to strengthen and confirm their opinion, that a decided winter of at least six weeks or two months' duration, with frost as well as snow, is indispensable to ensure final success with really good sorts of teas; and that, in the absence of that marked feature, although the shrub may thrive, and become in some manner productive, yet the quality of the leaf will not attain that degree of perfection which would render it fit for even common commercial purposes.

3. On the other hand, the Committee are aware that the arduous and distant transport of the plants grown in the tea provinces in China (to the consignment of which, as far as it may be possible, Mr. Gordon has been restricted) to Calcutta, and thence to the hills, may possibly impart to them a degree of tenderness and impatience of cold, which will require that they should be nursed on their first arrival in situations partaking of less severe degrees of cold. The committee would therefore suggest to you the expediency of some of the proposed sites being fixed at a comparatively low elevation among the hills, gradually ascending with the others to that height where the shrub may be expected to thrive best, and where the permanent seminaries are to be ultimately established for the supply of future tea plantations.

4. With respect to the size and number of the nurseries, the committee desire to be guided entirely by your own judgment and intimate local knowledge; only observing, that it appears expedient that the nurseries should be small in extent, and their number such as to afford sufficient scope for a satisfactory and complete trial of the growth of the tea within the province of Kamaon, and in this view five or six sites would probably not be too many.

5. The committee agreeing entirely with you in the utility of Mr. R. Blinkworth, plant and seed collector to this garden, being employed on this occasion, I am happy not only in concurring in this arrangement, but also in strongly recommending the services of a faithful and zealous man, who for many years has served under me, and who, from his long residence in Nepaul and in Kamaon (where he is at present stationed) must be well acquainted with the localities and natural productions of those countries. The necessary orders will accordingly be sent to Mr. Blinkworth.

6. In conclusion, I beg leave to inform you, that the Government, having granted to the committee the services of Dr. Falconer, superintendent of the botanic garden at Saharunpore, that officer will be requested to examine the countries situated between the heads of the Jumna and Ganges, for the purpose of selecting appropriate sites for tea nurseries in that direction.

I have, &c.
(signed) *N. Wallich*,
Officiating Sec. to the Committee of Tea Culture.

Tea Committee Office,
Head Botanic Garden, 28 June 1834.

EXTRACT INDIA REVENUE CONSULTATIONS, 10 December 1834.

EXTRACT Letter from Mr. *Gordon* to Dr. Wallich, Acting Secretary to the Tea Committee, dated Macao, 24 July 1834. No. 33.

FROM the Agent to the Dutch Company I learn that they have got at Java between 3,000,000 and 4,000,000 of plants; and that the Company is so sanguine of success, that they are extending the plantations vigorously. Their annual supply of seed is immense; and of last year's despatch half has actually come up in the nurseries. The produce, he asserts, is of very good quality, between peko and congo; but, owing perhaps to the youth of their plants, they have not yet succeeded in a perfect imitation either of peko or congo. He says, great pains were taken in the first instance to procure persons skilled in the manufacturing process; but, while little difficulty was experienced in getting 500 or 600 to emigrate as cultivators, they were only able to procure about a dozen professed tea-curers, and those perished in the massacre amongst 300 who were cut to pieces. This province, and that of Fokien, pour out annually thousands of able-bodied men, who settle in the several European colonies or Malay states. But these are driven to emigrate by the dread of starvation at home, while those whose employment is the manufacture of tea, are too well paid for their labour to be desirous of bettering their fortune by emigration, particularly under all the perils that attend such a breach of the laws by those from whose families anything can be extorted by the mandarins. The difficulty is enhanced in our case by our requiring men that have been born and brought up at a distance from the sea, and to whom the idea of a long voyage to a barbarous land is likely to be very terrific, independently of natural aversion to long separation from friends and family. Such men will of course require much stronger temptation than would suffice to induce a native of the coast to emigrate, and it is not impossible that we may even fail altogether in getting any such persons to come into our terms, in the first instance. We may be forced to content ourselves with procuring superintendents and cultivators for the present. If, at the end of two years, the superintendents see a clear prospect of their earning their reward, they will be glad to return to China for the purpose of engaging manufacturers of the best description; once fairly established, we shall be better able to judge what number of persons it may be necessary to procure to superintend the manipulation of the leaf.

You will observe, by Mr. Daniell's information, that the wages of the lowest class of labourers at the tea districts are from 80 to 100 cash a day, or from about sicca rupees 7 to rupees 8. 10 a month. At Java they have recourse to forced labour, and calculate that they can bring tea to market at half the Canton prices; so ought we, if we succeed. With respect to the teas of the coast, I have many conflicting accounts; the reason of this is, that as tea is not allowed to be brought by sea, and as there is no canal or river communication between the maritime provinces and Canton, the expense of land carriage is an inseparable bar to those teas coming to this market; so those who see them here can only judge of their quality from the common trash used by the people who navigate the petty coasting junks. From such specimens, however, no fair inference can be drawn regarding the better descriptions of the produce of Chittagong and Kyang-nan, which find their way even to Pekin. In a manuscript journal which I have seen, of one of the voyages to that coast, it is stated that there are numerous tea plantations on the large and lofty islands of the Chusan group, off the coat of Chilsyang (latitude 29° 30′), and that the produce was found remarkably fragrant. All the missionary travellers bear testimony to the excellent quality of the tea produced on the coast of Kyang-nan, but it is not known at Canton. Now, Mr. Jardine proposes despatching his vessel, called The Fairy, to wait The Colonel Young, now upon the east coast, and on board of which is Mr. Gutzlaff, with orders to proceed as far north as the latitude of Nankin, with a fresh supply of goods, which The Fairy will deliver.

It is my intention to avail myself of this opportunity of visiting the coast, where, with Mr. Gutzlaff's assistance, I shall make such arrangements for people, plants and seed, as, after personal examination of the quality of the tea produced, I may find expedient.

The Fairy only waits the return of Mr. Matheson, who is daily expected from Bombay. The Colonel Young will return to port before the change of the monsoon, so that I shall be back in time to proceed by the first ships of the season for Bengal, if, as I trust may be the case, my Canton friends shall by that time have succeeded in their part of the undertaking. At Canton I fell in with a country captain, who told me he was commissioned by the Bombay Government to procure cuttings of the tea plant. He has got a few shrubs supplied by the Canton gardeners in pots filled with blue clay, exactly similar to what is found in cutting tanks in Bengal, and this they have persuaded him is the soil of the best tea plantations.

Should we succeed ourselves, we must undeceive our Bombay neighbours, and supply them with some good seed, and a muster of soil, that their experiment may not be altogether useless.

Should I pick up any further information that may be useful or interesting to the Committee, I will write again before I embark in The Fairy. In the meantime I must throw myself on their indulgence for being unable to present them with less crude and imperfect remarks than the foregoing.

(signed) *G. J. Gordon.*

Query. At what height above the general level of the plains are the tea plantations commonly situated? Is the height generally so considerable, that those localities are materially colder in the summer months than valleys?—*A.* The hills on which tea is cultivated are not high, and the plantations, where the soil is favourable, extend over their whole face from their summit to their foot. The difference of temperature from that of the adjacent plains is scarcely perceptible. The soil consists of deposed granite, and the rocks which usually accompany it. On the nature of the soil depends principally the quality of tea.

In what months does it rain? Are the showers heavy and long continued, or light and frequent? Are fogs common, and at what season do they prevail? How long does snow generally cover the ground where the tea plantations lie? —Rain falls in March and April, during which months the showers are not very heavy, but the air is extremely damp. The finest leaves appear at this time, and are plucked early in April. In May the rain is very heavy, and the leaves begin to be of inferior quality.

At Boo-ee-Shan is there often severe and long-continued frost without snow? Are trees of any other species ever planted with tea to afford shelter from the sun or from storms? Are the seeds that are used for replacing trees, or forming new plantations, taken from plants reserved for that purpose, or from plants that have been stript of their leaves the same season?—No other tree is planted amongst the tea shrubs, but they are propped up with bamboos. Those plants which have yielded the most fragrant tea are also preferred for seed. There is no other appropriation or selection.

At what season do the seeds ripen? Are they gathered from trees as soon as ripe, or suffered to remain upon them over winter? Are they ever kept longer than from autumn till spring? How are they preserved? At what season are they put into the ground? How many are put together, and at what depth? How long are they in the ground before they come up?—Towards the end of February, or early in March. Seeds planted in the end of February come up almost immediately.

At what distance apart do the plants commonly stand?—About three chiks, three feet and a half.

Are the plants manured, and if so, at what stages of their growth, and in what manner?—But little manure is required, and that only at first, when some mud or thick mucilage is applied to each plant.

Are the plantations irrigated, and at what season, and how? How much dry tea is it calculated that 1,000 plants produce on an average of season? or, in other words, how many plants, or what extent of plantation, will produce a pecul of any tea? Are the same plants stripped of their leaves three times successively in one year, or are the younger plants stript at one season, and the older at another?—The leaves of every plant are gathered three times a year, young and old indiscriminately. Seedlings of one year's growth, if too thick, are thinned, but their leaves are not used for two years.

What quantity of leaves, estimated by their weight when dry, can a person collect in one day? in other words, how many persons labour, and for what time, does the whole process of gathering and preparing for market a pecul of tea require? What is the proportion between the different classes of labourers employed in gathering the leaves, and in the other steps of the process? What is the price of labour, when hired, in the tea districts?—The gatherers and the driers of the tea are quite distinct classes; the wages of the former 80 to 100 cash per day (4 ⅙ to 5 ⅕ annas), while some of the latter are paid 200 or 300 dollars for the season.

On what food do the labourers subsist?—The people live upon rice, salt greens, and occasionally animal food; this last not more frequently than once a week.

Are the tea-chests manufactured on the spot, or at a distance, and at what cost?—

Orig.

cost?—Tea-chests are manufactured on the spot, from wood which has been, by being steeped in water at least a year before it is used. This precaution is considered one of great importance.

Does the bamboo, of which the leaves are used in packing tea, grow on the spot, or are those leaves brought from a distance?—The bamboo grows in the tea country, and is cultivated solely for the sake of the leaf.

Are tea plantations ever let or sold? If so, at what rate; according to the space of ground, or number of trees?—Persons frequently contract for the produce of a plantation, but at different rates at different stages of its growth, paying the planter so much per pecul of dry tea, the contractor being at the expense of gathering and preparing the produce.

The gentleman whom I speak of as agent to the Dutch Company is Dutch consul here, and it is the government of Java, not the company, that are establishing tea plantations. Mr. Beale tells me, a correspondent of his at Samarang writes him, that every one unconnected with the tea project pronounces it a failure, but he does not state whether it is that the plant does not thrive, or that the produce is of inferior quality.

I doubt whether much dependence is to be placed on the assertion that the cultivators reside at a distance from the tea plantations. If it be so in a particular district, it is an exception, I am assured, to the general rule.

Dr. Morrison's son, who is an excellent Chinese scholar, has promised me to obtain from the Fokien gentleman the replies promised by his late father. I have asked him to sound the man (who is a poor scholar of 50, preparing for examination as a candidate for promotion in literary rank), and to offer to pay his expenses to Pekin, and give him a handsome gratuity besides, if he will look after the provision and despatch of a good supply of seed from the black-tea country; this, of course, after he has given all the information he may have regarding tea.

Mr. Pereira has been searching the records of the Macao government for the particulars of the Brazil tea colony, but has not succeeded, and the Dutch consul can only speak from recollection of what he has heard from Mr. Jacobson, so that we must after all be guided by our own views of the terms which ought to suffice to secure our object, and to go as little as possible beyond that limit.

(signed) *G. J. Gordon.*

EXTRACT INDIA REVENUE CONSULTATIONS, 7 January 1835.

No. 6.

From the Members of the Tea Committee to *W. H. Macnaghten*, Esq., Secretary to the Government in the Revenue Department.

Sir, 24 December 1834.

WE request that you will have the goodness to submit to the Right honourable the Governor-General in Council, the enclosed copies of the reports which we have received from Captain Jenkins, dated the 7th and 19th May; and from Lieutenant Charlton, dated the 17th May; also a subsequent communication from Lieutenant Charlton, dated the 5th of last month, together with the samples of the fruit and leaves of the tea plant of Upper Assam, which accompanied it, and some specimens of the leaves previously received.

2. It is with feelings of the highest possible satisfaction that we are enabled to announce to his Lordship in Council, that the tea shrub is beyond all doubt indigenous in Upper Assam, being found there, through an extent of country of one month's march within the Honourable Company's territories, from Suddya and Beesa, to the Chinese frontier province of Yunnam, where the shrub is cultivated for the sake of its leaf. We have no hesitation in declaring this discovery, which is due to the indefatigable researches of Captain Jenkins and Lieutenant Charlton, to be by far the most important and valuable that has ever been made on matters connected with the agricultural or commercial resources of this empire. We are perfectly confident that the tea plant which has been brought to light, will be found capable, under proper management, of being cultivated with complete success for commercial purposes, and that consequently the object of our labours may be before long fully realized.

3. It is proper to observe, that we were not altogether unprepared for this highly interesting event. We were acquainted with the fact, that so far back as 1826, the late ingenious Mr. David Scott sent down from Munnipore specimens of the leaves of a shrub, which he insisted upon was a real tea; and it will be seen from the enclosed reports from the agent to the Governor-general on the north-eastern frontier, and his assistant, that a similar assertion was strongly urged in regard to the existence of the tea in Upper Assam. Still we felt ourselves bound to suspend our decision on the subject until we should be in possession of the fruit of the reputed shrub, the only test which ought to guide us. We knew that several species of camellia were natives of the mountains of Hindustan, and that two of these were indigenous in our north-eastern frontier provinces; and taking into consideration the close affinity between the two genera, we were disposed to expect, that the alleged tea would prove nothing else but some sort of camellia. We have at length obtained the fruit of the Suddya plant from Lieutenant Charlton, and we are now enabled to state, with certainty, that not only is it a genuine tea, but that no doubt can be entertained of its being the identical tea of China, which is the exclusive source of all the varieties and shades of the tea of commerce. With the view of exhibiting the peculiarities in the structure of the fruit, on which depends entirely the difference between the tea and camellia, we have desired our officiating secretary to annex to this letter a sketch of the fruit of both, with explanatory remarks.

4. We beg leave most respectfully to submit the preceding facts to the particular consideration of Government, and earnestly to recommend, that in the first instance, and as early as may be practicable, one or more scientific gentlemen, properly qualified for the investigation, may be deputed into Upper Assam, for the purpose of collecting on the spot the greatest variety procurable of botanical, geological, and other details, which, as preliminary information, are absolutely necessary, before ulterior measures can be successfully taken with regard to the cultivation of the tea shrub of that country. We also beg to express our opinion, that it would be highly desirable to adopt forthwith the plan suggested in Lieutenant Charlton's last letter of the 5th of November, of establishing a communication with Yunnan by means of a land-road, at least as far as Hookam; since, independent of all other advantages, it would materially facilitate the operations of the scientific deputation which we have recommended should be sent to Upper Assam, with as little delay as possible.

5. We anticipate that the execution of the recommendations we have made need not be attended with any considerable expense; but it appears to us, with reference to the very great importance of the occasion, that the only consideration which should have weight is, that the money which may be required, should be faithfully and economically applied to the purposes for which it may be granted.

We have, &c.

(signed) *J. Pattle.* *R. Wilkinson.*
J. W. Grant. *R. D. Colquhoun.*
R. D. Mangles. *Radakant Deb.*
J. R. Colvin. *Ram Comul Sen.*
C. K. Robison. *N. Wallich,* M. D.

Calcutta, 24 December 1834.

EXTRACT INDIA REVENUE CONSULTATIONS, 7 January 1835.

No. 7.

From *F. Jenkins*, Esq., Agent to the Governor-General North-Eastern Frontier, Gowahatty, to the Secretary of the Committee of Tea Culture; 7 May 1834.

Sir,

I REGRET the delay that has occurred in acknowledging your circular, dated the 3d March, to my address; it has been occasioned by unavoidable circumstances, which I have further to regret will prevent my replying to your communication to the length I could wish, or the subject deserves.

2. My little acquaintance with Assam will not admit of my replying to all your questions; but from general information, and my own observation, I am so fully impressed with the belief of the fitness of the mountainous region which

divides Cachar from Assam for the growth of tea, that I beg to attempt to call the attention of the Committee to that region in the most forcible manner I can, with a view to its examination by a competent individual.

3. The mountainous tract I allude to, commences from the east of the country of the Jynteeah Raja, and continues always increasing in elevation until it reaches to the eastern end of the valley of Assam, and is so far under the control of British authority; immediately between Cachar and Assam completely so; and farther on, more or less directly or indirectly. The part entirely under us ranges from 6,000 to 8,000 feet, greatest heights; and farther east, the mountains attain a height of 10,000 feet, and the valleys and beds of streams are from 2,500 to 4,000 feet above the sea. From the end of the valley of Assam this ceases to be merely a west and east range, its direct continuation passes into China into the tea countries of Sechuen and Younan; the northern bend in the latitude of Sudya meets a branch of the snowy mountains, and the southern divides off into the two mountainous ranges which border the Irrawady on either side from its sources to the sea.

4. Every part of this mountainous country that I have visited presents nearly a uniform geological structure, being almost entirely composed of clay slate, and every where nearly of the same appearance, very much broken and disintegrated, so much so, as to be seldom visible in mass, and being covered with a deep coat of soil and luxuriant vegetation, even on the greatest heights.

5. Camellias are found in every part of this hill country; and within our jurisdiction in the Singpho district of Beesa, a coarse variety of the tea plant is, as I am informed, undoubtedly indigenous. A plant was given to me at Sudya, which I have reason to suppose was a genuine tea tree, and I intended to have brought it to Calcutta for examination, but I received it in a sickly state, and from the prevalence of great heat, I was unable to succeed in taking it to the Presidency. I shall endeavour to procure another plant or two for the satisfaction of the Committee. However, having no doubt myself of the fact of the tea shrub being found wild in the eastern parts of Assam, I would beg to recommend the expediency of some well-qualified person being at once sent up for the identification of the plants beyond any objection, for the examination of the soil in which it grows, as reported, and an inspection of the tract of mountains between Cachar and Assam.

6. If this recommendation were acted upon, the person deputed should be in Cachar by the 1st of November, and proceed immediately to ascend the mountains, in communication with the officer in civil charge, Capt. Fisher, who would previously have made arrangements for his being provided with porters, &c. He should pursue nearly the tract followed by me on the same journey, and on arrival at Bishonath, should proceed by water to Sudya, and thence go up to Beesa, at the foot of the mountains dividing Assam from Ava.

7. As the individual thus deputed would, of course, be a competent botanist, and perhaps geologist, I contemplate much indirect acquisition to science from the trip thus sketched out, it being almost entirely untrodden ground to any scientific observer, and of course it is to be expected that much benefit, in an economical point of view, might result to the State, from the researches and suggestions of one who could bring to knowledge the unlimited productions of the vegetable and mineral kingdoms in the regions in question.

8. In case you should not have forwarded a copy of your circular to Capt. Fisher, I shall do so, and request him to make a report to you upon the subject of it with reference to Cachar.

I have, &c.
(signed) *F. Jenkins,*
Agent to the Governor-General.

Political Agent's Office,
N. E. Frontier, Gowahatty,
7 May 1834.

EXTRACT Private Letter from Capt. *F. Jenkins,* to Mr. *Gordon,* dated the 19 May 1834; with Enclosures.

SINCE I wrote you officially, I have had the enclosed note from Capt. Charlton, of the Assam Light Infantry, regarding tea, and I have been presented with the enclosed luminous map of the tea districts in Upper Assam, by a shokun who accompanied Lieut. Burnett in an expedition to the top of the Patkoye range of hills, dividing the waters of the Burhampooter from those of the Kuendwa. On this range of hills the trees grow in great abundance, and are described to reach the size of small forest trees or very large shrubs. You will see how he says the leaves are treated, which though it seems rather an odd mode of manufacture, he and others persist in saying is the way in which the Singphos manage the tea. I never had an opportunity of trying it, but those who had, said it was palatable enough, and the leaves thus prepared keep for ever.

I have sent your circular to me, over to Fisher, in case you should not have done so, for his thoughts, and on return I will send it to Sudya.

(signed) *F. Jenkins.*

Copy of a Letter from Lieutenant *Charlton* to Captain *Jenkins*, enclosed in the preceding.

17 May 1834.

With regard to the circular from the Tea Committee which you showed me at Gowahatty, I have much pleasure in communicating the little I know of the tea plant of Assam. I was informed about three years ago of its being found growing wild in the vicinity of Beesa, at the foot of a low range of hills, and in the subjacent plains, from whence I obtained three or four young trees, which I gave to Dr. John Tytler, in Calcutta, with a view of their being planted in the Government botanical garden. I have since understood they decayed soon after.

The soil where they grew was described to be alluvial, like most parts of Assam, and the trees, rising to the height of 12 or 14 feet, were either at the foot or a small distance up the hills, but never on the summit, from which I infer a sheltered situation to be most favourable. The aspect was generally southerly, or south-east. I am sorry I cannot give you a minute description of the plant, not having it now before me; but so much I recollect, the leaves were about two inches in length and one in breadth, alternate eliptic-oblong and serrate. The flower white, very like that of the wild white rose, but much smaller. The seed I have not seen; it was described to be contained in a red, round, three-lobed capsule, the lobes detached or bursting along the upper sides, with a single seed in each. From what I have seen of the tea plant in different parts of the world, and lately in New Holland, propagated by seeds brought direct from China, I have little doubt but that that found near Beesa is a species of tea, and though it may be spurious or even a camellia, as Dr. Wallich suggests, its growing there indigenous and in great abundance affords good grounds for supposing that the introduction of the Chinese plants into Upper Assam would be attended with success. I have not had an opportunity of making any experiments on the leaves; they are devoid of smell in their green state, but acquire the fragrance and flavour of Chinese tea when dried. The Singphos and Kamptees are in the habit of drinking an infusion of the leaves, which I have lately understood they prepare by pulling them into small pieces, taking out the stalks and fibres, boiling and then squeezing them into a ball, which they dry in the sun and retain for use. I have written to Suddya for a specimen of the tea prepared in this manner, and for plants and seeds; I will send you some if I am able to procure them, and write to you on this subject more fully by-and-by.

(signed) *A. Charlton.*

Copy of a Private Letter from Lieutenant *Charlton* to Captain *Jenkins*.

Suddya, 8 November 1834.

I have now the pleasure of sending you some seeds and leaves of the tea tree of Assam, and am sorry that the unsettled state I have been in for the last three months has prevented my sending them so soon as I intended. The leaves you could have had before, but I was anxious to make them into something like tea, the best test that the tree is not a camellia, as Dr. Wallich imagines. It appears coarse, owing to the leaves being large and much too old, which could not at the time be obviated; but at the end of the cold weather, when the young leaves are on the trees, I hope to send you as good black tea as one generally receives from China. I will make experiments in the interim, in the art of preparing green.

The tree I now find is indigenous to this place as well as Beesa; and grows wild every here and there, all the way from this, about a month's journey to the Chinese province Younan, where I am told it is extensively cultivated. One or two people from that province have assured me, that the tea tree grown there exactly resembles the species that we have here, so I think there can be no longer any doubt of its being *boná fide* tea. What a pity that there is no means of communication between Suddya and Younan. A good land road made only as far as Hookum, and there are no natural obstacles of any consequence to prevent it, would afford an outlet for British merchandize into the very heart of China.

(signed) *A. Charlton.*

COPY of a Note of Captain *Jenkins* on the back of the above (at Gowahatty).

22 November 1834.

I HAVE only time to send this, and to say I have sent a jar of tea leaves, and a box of tea seeds, to go by to-day's dâk. I hope you will see from the seeds that there is no doubt ours is genuine tea, as it appears to me.

(signed) *F. Jenkins.*

EXTRACTS INDIA REVENUE CONSULTATIONS, 28th January 1835.

No. 8.

MEMORANDUM explanatory of the Sketches accompanying the Reports of the Committee of Tea Culture.

THERE is no danger of mistaking any plant for the tea, except the camellia. Both are very closely allied to each other in general appearance, in the form of their leaves, and the structure of the flowers. It is by the character of the fruit alone that they can be satisfactorily distinguished for practical purposes; in that respect the two genera differ very widely.

In both, the fruit consists of a roundish, more or less triangular, dry capsule, of three distinct cells, each cell containing one solitary seed or nut: at the period of maturity, the dehiscence or bursting takes place vertically, by means of three fissures, extending from the top of the capsule towards its base; so far their capsules are precisely alike: the following are the points of difference.

In the tea, the capsule is more or less deeply divided into the globular lobes, sometimes appearing as if it consisted of three round capsules united into one. The general outline is, therefore, always decidedly triangular, with extremely obtuse corners. The bursting proceeds along the middle of the lobes or angles, when a large seed is discovered through each aperture, enclosed on all sides within its proper cell, which cell is in fact formed by the corresponding lobe of the fruit. By this process six valves are, properly speaking, formed (and not three, as they are generally connected), each lobe splitting into two hemispherical valves. The partitions alternate with the lobes, and are formed by the sides of two adjoining cells, being, as it were, glued together, and extending to the axis of the capsule, from which they at length completely detach themselves, when it disappears altogether. The seeds or nuts are almost globular.

In camellia, the capsule is very obscurely triangular, without any tendency to become three-lobed; it bursts along the middle of each side (consequently alternately with the corners) into three very distinct valves, each of which belongs to two adjoining cells, because the three partitions originate lengthwise from the middle of the respective valves, and are therefore opposite or contrary to these, converging from thence to the triangular axis, from which they gradually separate, leaving it at length free and unconnected. The seeds are of an oval, oblong shape, smaller than those of the tea.

The preceding remarks are made with reference chiefly to the Assam tea, and the Nipal camellia and purposely without technical precision; the object being simply to convey a general idea of the structure of the two sorts of fruit. But they admit of being applied with safety to all other instances of comparison between the genera in question.

References to the Figures.

(A.) The Assam tea. Figs. 1, 2, 3, ripe capsules, scarcely enlarged; at 1, seen from below, deeply three-lobed; 2, the common form, commencing to burst; 3, the same completely burst open, and discovering the seeds; 4, a detached seed, nearly of the natural size; 5, the lower half of a ripe capsule, divided by an horizontal section, and the seeds removed, exhibiting the places of dehiscence along the angles or lobes, and the partitions alternating with these, and separating from the axis, considerably enlarged; 6, outline of a full-grown leaf, of the natural dimensions.

(B.) The Nipal camellia. Fig. 7, ripe and entire capsule, slightly enlarged; 8, and 9, the same, after bursting, the free axis being seen in the last figure; 10, an horizontal section, as in the tea, much enlarged, representing the places of bursting, which alternate with the angles of the fruit, and the partitions, which are opposite to the angles of the fruit and to the valves, separating from the free axis; 11, a detached seed, natural size; 12, outline of a full-grown leaf.

H. C. Botanic Garden, (signed) *N. Wallich*, M. D.
24 December 1834.

EXTRACT of a Private Letter from Captain *Jenkins*, Agent to the Governor-General on the North-Eastern Frontier, to the Officiating Secretary to the Tea Committee, dated 6 January 1835. No. 10.

I do not relish the proposal for you to come this way at this season of the year, the period is gone by for a mere visit: and I should recommend that one of the gentlemen you wished to depute should be sent up without further loss of time to Chirar, thence to come here and take boat for Sudya, where I would propose his being housed all the rains, employing himself in getting all the information during the season of inactivity, and prepared to start thence at the earliest possible period, in such direction as his previous inquiries might lead him to consider most expedient.

The information needful for the subsequent measures I anticipate as certain, is not to be gathered in a mere passage through the country; at least I should not think such hasty gleanings safe. The officer who is deputed should most assuredly be accompanied by two or three able Chinamen, men acquainted with the cultivation of tea, if possibly procurable; if not, good agriculturists, and sensible, clever men, who could be sent into Hookoom, or into Yunnan, as may seem necessary, and at least be able to carry on a correspondence with their countrymen.

We have had letters in Chinese about opening a trade; so said the bearers; but I believe the letters have never been readable in Assam.

The Chinamen who come from Yunnan to Ava are, I think, all Mahometans, and one or two of these, if procurable, would be of course the men to send up to us, that we might despatch them home to lead their own people into Assam. A few colonists direct from Yunnan would commence the cultivation of our plant, if it be the same as that of Yunnan, of which I have no doubt, with the greatest chance of success; and if we do not possess the right varieties, they would procure them. I wrote some time ago to Government about addressing the Resident at Ava to take steps for opening the trade between Ava and Assam, always having in view the prospect of bringing a part of the trade of Yunnan direct into our province, and this, I think, should be strenuously recommended by the Tea Committee, for if the road be once opened, we shall most assuredly be able to get Chinese cultivators, all, I think, that we require, in any number. We have about Sudya an unlimited range of wastes, wastes enough for three or four millions of people, which implies, of course, that our population is very scanty, and what is worse, they are very rude; fine, able, strong men, but without the introduction of a more civilized race they are not convertible to immediate use. I should therefore propose that a very strong attempt be made to open a fully free communication between Ava and Assam, and if practicable, that the Resident should be directed to send up a European officer to Sudya, by way of commencement, to meet your botanist at Sudya. This road, of all the roads communicating with Ava and British India, is the most important, and it is the only one that has not been visited by a British officer. I look upon it as a *sine qua non* to the commencement of any tea cultivation to any extent, that we be able to get colonies direct of Shans or Chinese; and the same measures that will enable us to command these, will also, without fail, immensely extend the general commerce of the east of India, besides, which is incidental, and of no small importance, put Ava entirely at our disposal, if the Burmahs should ever forget the last war; and, what is a consequence of our attaining a commanding position, keep that government from all warlike thoughts, and bind us together in amity to proceed in detaching Yunnan from China, may be, in case of need, and in the fulness of time.

(A true extract.)

(signed) *N. Wallich*, M. D.,
Officiating Secretary to the Tea Committee.

EXTRACT INDIA REVENUE CONSULTATIONS, 13 March 1835.

From Members of the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Government of India.

Sir, 12 March 1835.

WE have the honour to acknowledge the receipt of the orders of the Right Honourable the Governor-general of India in Council, conveyed in your letter of the 28th January, in answer to our letter of the 24th December, and our officiating secretary's of the 19th ultimo, on the subject of the growth of the tea shrub in Upper Assam, and approving of our recommendation for the deputation to the spot of one or more scientific gentlemen, properly qualified for the accomplishment of the purposes which we have particularly stated.

2. In obedience to the instructions of his Lordship in Council, directing us to report the names of the officers whom we would propose for employment on this important duty, and the terms of remuneration which we would recommend to be assigned to them respectively, we have the honour to submit, that in our opinion, the employment of Doctor Wallich, aided by Mr. Assistant-surgeon M'Clelland, of this establishment, and Mr. Assistant-surgeon Griffith, of the Madras establishment, the latter at present at Tavoy, and the former in Kumaon, will afford the best prospect of success. Indeed we may confidently assert, that if his superior qualifications for the adequate discharge of this duty do not conduce to the most satisfactory results, they may be looked for in vain by any other arrangement.

3. We are particularly anxious to obtain for Dr. Wallich the aid of Mr. Assistant-surgeon M'Clelland, as being an experienced geologist, and we are equally desirous that Dr. Wallich should have also the aid of Mr. Assistant-surgeon Griffith, as we consider it to be of very great importance that the objects of the mission may be completely accomplished in the course of one season.

4. We would respectfully suggest that the remuneration to Dr. Wallich during his continuance in the execution of these special and arduous duties, may be fixed at 500 rupees per mensem, he being afforded the aid of the Government establishment for his travelling, his guard, &c., and that his assistants may each have a consolidated allowance of 500 rupees per mensem, together with the same assistance for their travelling.

5. We have the honour to submit for the consideration of the Right Honourable the Governor-general of India in Council, copies of a letter we addressed to Captain Jenkins, dated the 16th ultimo, and of his answer, dated the 20th ultimo; and with reference to the season for active local operations having expired, and to the earliest period when Dr. Wallich's personal services can be needed on this mission, we would propose that we should be instructed to direct him

and his assistants to be at Suddya by the 1st of November next, and also to require Dr. Wallich to convey intermediately, to Captain Jenkins and Lieutenant Charlton, such suggestions as will guide them in the collection of all the information and materials that may be calculated to enable him to commence operations from the instant of his arrival at Suddya.

6. We beg to avail ourselves of this opportunity for intimating to his Lordship in Council, that we have deemed it expedient to direct Mr. Gordon to return to Bengal with the least practicable delay. The following are the considerations which have led us to this determination. The discovery of the growth of the tea in Upper Assam, and the reports which we have received of the facility of multiplying it to any extent by seeds, render all supplies from China unnecessary, inasmuch as there is every reason to suppose, that seeds, even of the best sorts of tea, will produce only inferior sorts of plants when removed from their native soil; and the extensive supplies of the bohea kind, which we have lately received from Mr. Gordon, together with those of the tea which may be expected to arrive soon, will answer all purposes of a trial. Besides, there is this great advantage in favour of the seeds produced within our own territories, that they may be had in a perfectly fresh state, and with comparatively little or no expense. With regard to the importation of Chinese cultivators and manufacturers, we are of opinion, that the plan suggested by Captain Jenkins, in the letter which accompanied our officiating secretary's letter of the 19th ultimo, for procuring that class of people from Yunnan, is far preferable to bringing them from China; at any rate it holds out an auxiliary resource in case Mr. Gordon, on the receipt of our instructions, should not have succeeded in procuring people willing to proceed to Bengal.

We have &c.

(signed) *J. Pattle.* *C. K. Robison.*
J. W. Grant. *Robert Wilkinson.*
C. E. Trevelyan. *Radhakant Deb.*
Ross D. Mangles. *Ram Comul Sen.*
J. R. Colvin.

P.S.—Since the above letter was draughted, we have received the enclosed letter from Dr. Wallich, which we would strongly recommend for favourable consideration.

(signed) *J. Pattle.* *J. R. Colvin.*
J. W. Grant. *Robert Wilkinson.*
Ross D. Mangles. *Radakant Deb.*
C. E. Trevelyan. *Ram Comul Sen.*
C. K. Robison.

(True copy.)

(signed) *J. W. Grant,*
Depy Secy to the Govt of India.

From Captain *Jenkins*, Agent to the Governor-general, Assam, to *N. Wallich*, Esq., M. D., Secretary to the Tea Committee; 26 February 1835.

Sir,

I HAVE the honour to acknowledge the receipt this day of your letter of the 16th instant.

2. In addressing you on the 6th of last month, I conceive there was still some time remaining of this season that might be usefully employed at Sudya in inquiries preparatory to a trip into the districts producing the tea plant; but the season is short in the eastern extremity of Assam, and at present there can be no doubt that ere this letter could be acted upon below, it would be a useless exposure to attempt sending up any individual until the rains are over.

3. I would beg to suggest, however, that as early as possible the gentlemen to be deputed eventually to Sudya should be directed to proceed to the Kasiah hills, to be at hand to take advantage of the earliest possible period of starting, which would probably be between the 1st and 15th of October. From Churiah

they would come to this station, where their boats should be previously got ready.

4. I am of opinion not only that the services of the gentlemen deputed might be very advantageously employed in the meantime in the Kasiah hills in general pursuits of natural history, the results of which might be of importance to this frontier, but that it is highly probable that their researches might be made conducive to the particular subject of their mission, by the discovery of favourable localities for plantations in those hills. The very singular variety of aspect and climate possessed by that part of this range of hills, which commences with Central Cachar and ends in the Garrow hills, inclines me to suppose that we could grow within it every variety of tea known in commerce.

5. I consider the Garrow hills to resemble more nearly the country of the Brazils, into which the tea has been so successfully introduced, than any country in India that I am in any way acquainted with. Although these hills are dreadful for notorious unhealthiness, this is true only of the jungles below them; the central tracts may be approached safely from the Kasiah country. They are elevated and, I believe, salubrious, and wonderfully rich in vegetable and mineral productions. On these subjects the gentlemen deputed, during their detention in the hills, could not fail of making most interesting and valuable investigations.

6. I have only further to observe, that if our relations with Ava admit of it, I would most strongly suggest, that the present deputation should, after a residence of a couple of months on our frontier, cross the Patkoye hills, and proceed through the Ava Shan provinces to the frontier of Yunnan; this would bring us acquainted with all the districts east of China producing the tea plant, and their journey would otherwise be of the very highest importance to the empire in all points of view. With regard to useful information of every sort that would be acquired by such an extension of their trip, I know of no journey that could be undertaken from British India likely to be attended with more valuable results.

(signed) *F. Jenkins*,
Agent to Governor-General.

Political Agent's Office, Assam,
26 February 1835.

EXTRACT INDIA REVENUE CONSULTATIONS, 13 March 1835.

No. 4. From *W. H. Macnaghten*, Esq., Secretary to Government of India, to *N. Wallich*, Esq., M. D., Officiating Secretary to the Tea Committee; 11 February 1835.

Sir,

I AM directed by the Right Honourable the Governor-general of India in Council to acknowledge the receipt of your letter dated the 28th ultimo, and in reply to request that you will inform the Committee, that his Lordship in Council has been pleased to sanction the appointment of Mr. C. A. Bance, upon a salary of 150 rupees per mensem, for the charge of the tea nurseries to be prepared in Upper Assam, at Sudya, and other places.

2. His Lordship in Council is also pleased to authorize the outlay of such sums as may be necessary for the formation and maintenance of the nurseries. Periodical statements of their expenditure will be submitted by the Committee for the information of Government.

3. A copy of the present correspondence has been forwarded to the Commissioner of Assam, with instructions to him to arrange for the payment of the allowance to Mr. Bruce, and the disbursements above authorized, from the nearest treasury under his authority.

(signed) *W. H. Macnaghten*,
Secretary to Government of India.

Council Chamber, 11 February 1835.

EXTRACT INDIA REVENUE CONSULTATIONS, 5 March 1835.

From *G. J. Gordon*, Esq. to Dr. *Wallich*; Lintin, 23 November 1834. No. 70.

Sir,

FOR three weeks after my joining the "Colonel Young" on the coast, the weather continued so boisterous, that we should certainly have been frustrated had we attempted to proceed to Ning Fe Hyen in the "Fairy" within the term limited for her return. In the meantime, Mr. Gutzlaff was active in his inquiries regarding the most eligible route to the Ankoy (Nyan Ki) hills; and it was finally determined that we should land from a deep bay, which you will find in the map of the province of Fokien, lying between the bay of Suen Chen-fu on the north, and that of Hya-men, or Amivi, on the south. Owing to the want of any chart of the bay, we durst not anchor farther up than within about 20 miles of its head, and it was not till the 7th that the weather moderated so far as to make it safe for a boat to go so great a distance. On the morning of the 8th November we at last set out on our expedition, from which we safely returned on the 13th. Accompanying I have the pleasure of sending you a journal of occurrences and observations on this little trip, taken from memoranda kept by Mr. Gutzlaff and myself. The success of this first attempt has only served to make me more eagerly desirous of visiting both Woo-ee and the green-tea districts to the north; but I apprehend it will be necessary to return to Bengal in the first instance with the cultivators expected from Bohea. I am strongly persuaded that the inferiority of Ankoy tea arises more from unskilful culture and preparation of the leaf than from soil or climate; I made, therefore, no offer to the peasantry at Twa-Be to accompany me to Bengal as planters, reserving recourse to them as a *pis aller*, in case of disappointment in the other quarter. With reference to the brittleness and thinness of the shell which covers the tea-seed, as well as to the moist, and, at the same time, oily nature of the kernel, I have judged it most expedient to put them up in barrels with dry sand, as giving them the best chance for preservation. Mr. Beale will sow a few of them in his garden to ascertain whether they are at present in good vegetating condition; and if they are, I trust they will continue in that state till they reach Almora, where they should be immediately sown in beds, such as I have described in my journal. I take it for granted, that the moment they reach you they will be despatched, in well-soldered tin canisters, to Mr. Traill, with such instructions as you may think expedient. They are said to take three months to spring, and are not transplanted till the ensuing month of March. It is still a question in my mind, whether part of that interval may not be spent by me to greater advantage in China than in Bengal. Mr. Gutzalff is now perfectly willing to accompany me to the Woo-ee district, as well as to the northward, and I may never be able again to command his invaluable assistance, without which it would be quite in vain to attempt a journey of such length into the interior. Should my final determination be to remain in China with this view, it will be desirable to postpone the expedition till the month of March, that I may have an opportunity of witnessing the process of gathering and preparing the leaf. On this point I propose consulting with Mr. Daniell, and I shall probably be guided by his recommendation.

Should my native agent fail in procuring planters to proceed with me, I shall certainly remain to wait the success of other springs, which Mr. Gutzlaff proposes to put in motion. None of my English friends here have been able to do anything towards the object of my mission, and I attribute to Mr. Gutzlaff alone my success, as far as it has hitherto gone, or may eventually be attained. I mentioned to you in my last, that, before my return to the coast, several of the contractors had announced that they had seed ready for delivery; as anticipated, it was found to be unripe, and was rejected on that score, without reference to the suspiciousness of its origin. For all these services, and as a further retaining fee, I have given Mr. Gutzlaff an order on Mr. Daniell for (Spanish dollars, 1,000) 1,000 Spanish dollars, which I trust the Committee will approve. By going to the coast, I might doubtless have of myself been able to procure some sort of tea-seed, but, without his aid, none that could be in the slightest degree depended upon as genuine. I have no doubt, either, that I might have engaged the same agents as the Dutch, but it would have been with the almost sure result of being supplied with seeds from plants growing within the province of Quantong, which, with reference to my instructions, I should have considered as only one degree short of total failure in my mission.

Should the result of further deliberation and consultation with my friends be in favour of my return to Bengal this season, I will take care to leave such directions as will, I trust, secure a further annual supply of Bohea tea-seed, as well as a supply of tea-seed and plants from the green-tea districts; and in the same case, I shall return by the very first opportunity after the arrival here of the Bohea planters, whom I expect in January.

Lintin, 23 November 1834. (signed) *G. J. Gordon.*

P. S.—I have furnished Miss Napier with a small quantity of tea-seed, which she intends trying in Scotland.

(signed) *G. J. G.*

EXTRACT INDIA REVENUE CONSULTATIONS, 30 March 1835.

No. 19. From *N. Wallich*, Esq., Officiating Secretary to the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to the Government of India, &c. &c. &c.

Dear Sir, Botanic Garden, 24 January 1835.

I HASTEN to send you, for the purpose of your doing me the honour to submit them to the Right Honourable the Governor-general, samples of tea-seeds and fruits, which were safely landed here late yesterday evening from the Forth, having been sent round from China by Mr. Gordon in November. The consignment consists of one hogshead, one quarter cask, and a small case; and upon the whole, this noble supply of seeds appears fresh and good. I have already taken the orders of the Committee (previous to the landing of the seeds), for their being divided between Kumaon, Sirinore, and *our own* tea province, Upper Assam.

The seeds are of Bohea te[illegible] and I shall with the least possible delay be able to report as to the vegetativ[illegible]ate of them: a quantity shall be sown here this day.

But I have feelings of a still more intense pleasure on this occasion, for I am able to verify, beyond all further question, the Committee's Report to Government relative to the genuineness of the Assam tea. More than that, the correctness of the distinctive characters of the tea and camellia has also on this occasion been most amply and fully confirmed. Most fortunately it has so happened that there were a few camellia capsules among the supplies just received; they are of course of a China species. I beg to add them to the tea seeds in the accompanying bottle (wrapped in a separate small paper) in order to satisfy his Lordship that the sketch of the Nepaul camellia (copied from the Plantæ Asiaticæ Rariores), which accompanied the Committee's Report, is a faithful representation of the Chinese camellia also.

I have, &c.
(signed) *N. Wallich.*

No. 20. (No. 27.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee, dated 30 March 1835.

Gentlemen,

I AM directed by the Governor-general of India in Council to acknowledge the receipt of your officiating secretary's letter, dated the 24th of January, submitting samples of tea-seeds and fruits recently landed from China.

2. It appears to be your intention to divide this supply between Kumaon, Sirinore, and Upper Assam; but I am desired to suggest to you, that it would be desirable to extend the experimental cultivation to other parts of India, and to request that you will forward a portion of the present supply to the chief secretary to Government Fort St. George, with a view to its being distributed to the commissioner and resident in Mysore, and to the superintendent of the Nulgherrie hills.

3. The commissioner will be instructed to endeavour to introduce the cultitation into the Nuggur district, and the resident will be instructed to forward the supply which he may receive to the superintendent of Coorg, with a view to its introduction into that country.

4. All three officers will be directed to furnish, through me, for your information, the result of the experiment, and you are requested to accompany the supply of seeds with such suggestions as to the mode of cultivation as you may deem calculated to ensure its success.

Council Chamber, 30 March 1835. (signed) *W. H. Macnaghten*,
Secretary to the Government of India.

Extract India Revenue Consultations, 1 June 1835.

From *N. Wallich*, Esq., Officiating Secretary to the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Government of India; 20 May 1835. No. 12.

Sir,

I am directed by the Tea Committee to send you, for the purpose of being laid before the Honourable the Governor-general of India in Council, the accompanying packet, containing a sample of Assam tea prepared by Lieut. Charlton, of Suddya, and recently received by dawk Banghy.

2. Owing to the unusual wet and boisterous weather which has been experienced of late, and notwithstanding the precaution that had been taken before despatching the sample, by packing it in a tin case enclosed within a strong wooden box, covered with wax cloth, the heavy rains had penetrated, and the tea arrived in a perfectly damp and mouldy condition. It was immediately placed in the sun and dried, and is now submitted to the examination of Government.

3. Considering the above unfortunate accident, and likewise that the leaves were gathered from the wild or crab tree, and have not undergone a proper course of manipulation, the Committee are of opinion that the sample affords the most satisfactory evidence that the result of the active investigation in which they are engaged will prove highly important and successful. It will be found that the tea, notwithstanding what has happened to it, is equal to the ordinary black sort (Congou), in common use among the lower orders at home, and that it bears also a favourable comparison with the Burmese or Shan tea, of which, by order of the Committee, I beg leave to send a large ball, which was presented to them by Lieut.-Colonel Burney, the Resident at Ava.

Tea Committee's Office, (signed) *N. Wallich*, M.D.,
H. C. Botanic Garden, 20 May 1835. Officiating Secretary.

(No. 61.)—From *W. H. Macnaghten*, Esq., Secretary to Government of India, to *N. Wallich*, Esq., Officiating Secretary to the Tea Committee; 1 June 1835. No. 13.

Sir,

I am directed by the Honourable the Governor-general of India in Council to acknowledge the receipt of your letter, dated the 20th ult., and the specimens of tea which accompanied it, and in reply to request that you will acquaint the Committee of the gratification derived by Government from the satisfactory prospect thus afforded, that the result of the important investigation in which they are now engaged will prove successful.

Council Chamber, 1 June 1835. (signed) *W. H. Macnaghten*,
Secretary to Government of India.

EXTRACT INDIA REVENUE CONSULTATIONS, 18 May 1835.

No. 9. From *N. Wallich*, Esq., M. D., Officiating Secretary to Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to the Government of India; 6 May 1835.

Sir,

I AM directed by the Tea Committee to send you, for the purpose of being submitted to the consideration of the Honourable the Governor-general of India in Council, the accompanying copy of a communication from Mr. Trevelyan, dated the 18th ultimo, and of two letters therein referred to from Captain Jenkins and Lieutenant Charlton.

2. The Committee concurring entirely in the sentiments and views expressed in these letters, and being of opinion that the object of their labours would be greatly promoted by their being allowed to hold out to the Rev. Mr. Gutzlaff's enterprize the encouragement proposed by Mr. Trevelyan, they beg leave to recommend that they may be authorized to intimate to the Rev. Gentleman, that in the event of his undertaking, and successfully performing, the overland journey through China to Assam, he will be suitably rewarded by this Government.

(signed) *N. Wallich*, M. D.,
Officiating Secretary.

Tea Committee's Office, H. C. Botanic
Gardens, 6 May 1835.

No. 10. Enclosure. From *C. E. Trevelyan*, Esq., to Dr. *Wallich*.

My dear Sir, Calcutta, 18 April 1835.

WHEN my friend Coverly Jackson, of our civil service, returned from China, about two years ago, he informed me that Mr. Gutzlaff had it in contemplation to penetrate into Assam through Yunnan, and on my causing the circumstance to be intimated to Lord William, I was authorized by his Lordship to say, that if Mr. Gutzlaff succeeded in making the journey he would be rewarded for it; my attention was again called to the subject by a conversation I had a few months since with Mr. Clarke, the late China writer, and I wrote in consequence to Captain Jenkins, whose reply I send you, together with its enclosure.

You are welcome to keep these letters, and make any use of them you like. I think a person so remarkably qualified as Mr. Gutzlaff is said to be, could not employ his time better than in exploring the interior of China, and ascertaining the facilities which exist for such communication between it and Calcutta.

Perhaps the Tea Committee would recommend to Government, that the same kind of general encouragement should be held out to Mr. Gutzlaff to do so, as I was authorized by Lord William to give; or some specific plan, with its appropriate reward, might be suggested to him, with reference to the increased degree of importance which now belongs to the inquiries. Might it not be as well to have the double chance of success, which would be obtained by Mr. Gutzlaff's setting off for Assam at the same time that you and your companions start for Yunnan.

(signed) *C. E. Trevelyan*.

From Captain *F. Jenkins* to *C. E. Trevelyan*, Esq.

Sir, Gowahatty, 9 April 1835.

I DID not reply to your note about Mr. Gutzlaff sooner, as I wished to have Lieutenant Charlton's opinion on the subject of his intended journey. I am now able to send you this, and I do not know that I have much to add. Of course Mr. G. would come in a Chinese dress, and would know the road to Santafaw, on the eastern side, and thence I cannot imagine any difficulty in his finding his way into Ava, or Assam. The most interesting route, however, by far, would be up the great Nankin river, and thence across from the head of that river (from a northerly and southerly direction to its due eastern course) to Bhor Khamti, where Wilcox finished his survey.

In that short distance he would be able to solve all the problems about the great rivers of Cambodia, Cochin, and Laos; whether or not they come from Upper Tartary. This part of the world is totally unknown to us, and I believe to the Chinese; it was never crossed by their armies that we know of, and was never penetrated by the Jesuit missionaries. If Colonel Burney could be prevailed upon to move up the Irrawaddy as far as it is navigable, he would pick up a great deal of information that would be serviceable to us. The two countries may be highly useful to each other; but only by our assuming our proper position, and dictating whatever we may feel to be necessary for the good of either. The country is prostrate before us, and the population would be glad to put themselves under our protection; but we cannot open a trade from Assam to Ava, that would be so profitable to India and all the countries east, merely to indulge his Majesty in a vain fancy, that by the interdiction, he makes his country less accessible in case of the recurrence of a war. Lieutenant Charlton's postscript requires, I think, immediate attention; we ought to do something to improve the road on our side; and the small revenue we shall now raise at Sudya might most profitably be spent on these local improvements.

(signed) *F. Jenkins.*

From Lieutenant *A. Charlton* to Captain *Jenkins.*

Sir, Sudya, 30 March 1835.

I HAD yesterday the pleasure of receiving your letter of the 12th instant, and am glad to hear there is a prospect of Mr. Gutzlaff's penetrating from Canton through Yunnan to Assam. His best plan would be, I think, on leaving Yunnan, to accompany the caravan which starts from the frontier town of Chanda, or Santa, for Munkoom and Hookoom, in the Burmah territory, annually in the month of October or November, consisting of from 500 to 1,000 traders; and if he could travel as a Chinaman incognito, so much the better; he need not then be apprehensive of the slightest danger or molestation. There appears to be a good understanding between the Chinese, Shans, Burmese, and Singphoos, with whom he would come in contact after leaving Yunnan: but if it be discovered his being a European, I would recommend his not leaving Mankoom without a guard of Burma sepoys, or some influential person on the part of the governor, Moha Seree Kio Dang, to accompany him as far as our frontier, the Patkay hills. The following, I am told, is the direct route from the frontier town of Santa to this place; but I cannot enumerate all the intermediate stages:

	From Santa to Hookum - - - -	21	days' journey.
	– Hookum to the Patkay Hills -	5	– –
Hon. Company's Territories.	– Patkay Hills to Beesa - - -	3	—
	– Beesa to Sudyah, by water - -	1	—
		30	

But the route the caravan takes is, I believe,

From Santa to Moonkoom - - -	15	days.
– Moonkoom to Hookoom - -	8	–

Which makes the journey 32 days from Santa to this place. None of the Chinese merchants have hitherto come nearer to our territory than Hookoom; but from the inquiries they have been making lately, I fully expect to see some of them at Sudyah in December or January next, especially if any of their countrymen are sent up here, whom Mr. Gordon is to bring from China.

(signed) *A. Charlton.*

The road is good, I believe, from Santa to the Patkay hills; after which, I need not tell you, it is very bad indeed. The Chinese carry their merchandize on mules.

No. 18.

EXTRACT INDIA REVENUE CONSULTATIONS, 6 July 1835.

(No. 67.)—From *W. H. Macnaghten*, Esq., Secretary to Government of India. to Officiating Secretary to the Tea Committee; 6 July 1835.

Sir,

I AM desired by the Honourable the Governor-general of India in Council to acknowledge the receipt of your letter, dated the 25th ultimo, on the subject of the proposed overland-journey by Mr. Gutzlaff, from China to Assam.

2. The Tea Committee recommend, that in the event of the journey in question being undertaken by that gentleman, he should be guaranteed his Chinese allowance of 800 *l.* per annum during his absence, and an additional remuneration of 5,000 rupees.

3. The Governor-general in Council is of opinion, that the proposed journey might be productive of advantage, from the increased knowledge which it would afford of China and the intervening countries, and that it embraces national objects, for which the authorities under the Crown in China might be disposed to afford support to the undertaking, by permitting Mr. Gutzlaff to draw the salary attached to his office during the period of his absence, in which case the Governor-general of India in Council will be prepared to present Mr. Gutzlaff with the sum of 5,000 rupees, on the completion of his journey; or if the authorities in China will consent to furnish two-thirds of the amount required for this purpose, (namely, the salary of Mr. Gutzlaff, during his absence, and the bonus of 5,000 rupees,) the Company's Government will supply the remaining third of those sums.

4. You are authorized to conclude the arrangement for Mr. Gutzlaff's journey on either of these terms, reporting the result for the information of the Governor-general in Council.

(signed) *W. H. Macnaghten*,
Secretary to Government of India.

Council Chamber,
6 July 1835.

No. 1

EXTRACT INDIA REVENUE CONSULTATIONS, 21 September 1835.

From the Tea Committee to *W. H. Macnaghten*, Esq., Secretary to the Government of India; 18 September 1835.

Sir,

WE beg to report to you, for the information of the Honourable the Governor-general of India, the return of our secretary, Mr. Gordon, from China, in obedience to our instructions, as sanctioned by Government in their proceedings of 13 March last.

Mr. Gordon has already sent a large supply of tea-seeds of the black tea kind, and had, in March last, engaged a party to proceed to the green tea country for the sake of procuring a supply of seed of that description, also as well as of engaging persons properly qualified to superintend its cultivation, and the manipulation of the leaves.

Mr. Gordon had also, previously to leaving Canton, engaged two emissaries to proceed to the Bohea country, for the purpose of acquiring important information regarding the cultivation and manufacture of the best black teas, and of engaging competent superintendents.

Should the emissaries above alluded to succeed in their missions, so far as to bring to Canton persons of the required description, the expenses incurred will, inclusive of advances, amount to about 4,500 dollars; and there will still remain a risk that the superintendents engaged may draw back when they find their services are required beyond the limits of China.

Mr. Gordon has taken the precaution to engage the best services of some of his private friends residing at Canton and Macao in perfecting those arrangements, by entering into such engagements with the cultivators, &c., as may induce them to proceed to Bengal; and, in taking measures for the safe transmission of such seeds and plants as they may bring. Looking, however, upon the acquisition of properly qualified persons to superintend the cultivation and manufacture of tea, as of vital importance to the successful introduction of tea culture within the British territories in India, and, in fact, as forming the only desideratum now required to ensure so important a result, we cannot but feel a most anxious wish that Mr. Gordon were himself on the spot to conclude such agreements as may be requisite with that view, and to remove all such doubts and apprehensions as might tend to deter the persons alluded to from undertaking so distant a voyage.

We have, therefore, earnestly to request the sanction of his Honor in Council, for the immediate return of Mr. Gordon to China. His absence is not likely to exceed the period of three, or, at the utmost, of four months; and there are no important duties for him to be performed here that can come in the least in competition, in the estimation of the Committee, with the paramount object likely to be attained by his speedy return to China.

As the season for a re-voyage to China is already far advanced, we solicit the earliest intimation of the decision of his Honor in Council on the point submitted.

We have, &c.

(signed) *J. Pattle.* *C. E. Trevelyan.*
J. W. Grant. *C. K. Robison.*
J. R. Colvin.

Calcutta, 18 September 1835.

From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee, dated 21st September 1835.

Gentlemen, No. 2.

I AM directed to acknowledge the receipt of your letter, dated the 18th instant, reporting the return of Mr. Gordon from China, and the steps taken by him to secure seeds, plants, and cultivators, and requesting sanction for his return to China for the purpose of completing the arrangements which he has already put in train.

2. In reply, I am desired to acquaint you, that in compliance with the recommendation of the Committee, the Honourable the Governor-general of India in Council has been pleased to sanction Mr. Gordon's return to China, and the continuance to him of the additional allowance of 500 rupees per mensem, for the further period of four months.

I have, &c.

Council Chamber,
21 Sept. 1835.

(signed) *W. H. Macnaghten*,
Secretary to the Government of India.

Ordered, That the necessary communication be made to the civil auditor.

EXTRACT INDIA REVENUE CONSULTATIONS, 24 August 1835.

From *N. Wallich*, Esq., M.D., Officiating Secretary, Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to the Government of India, Revenue Department, dated 11 August 1835. No. 2.

Sir,

ON the 20th of May I had the honour, by order of the Tea Committee, to forward to you a sample of tea produced at Assam from the wild plants growing about Suddeya. The Committee having within these few days received a further supply from Lieutenant Charlton, which, being packed in well-corked bottles, has arrived in a much better condition than the above sample, I am directed to send you the accompanying specimen of it, requesting that you will please to submit it to the Honourable the Governor-general of India in Council, as a much more satisfactory sample of the Assam tea, both in regard to smell and taste, than that previously furnished, which, as I intimated at the time, had suffered from mouldiness. I beg leave to observe, that in both instances the leaves have been gathered from the wild shrub, and that they have not undergone that proper course of manipulation which alone is capable of imparting and securing the genuine flavour to any sort of tea.

I have, &c.
Tea Committee Office, Botanic Garden, 11 August 1835.
(signed) *N. Wallich*, M.D., Officiating Secretary, Tea Committee.

No. 3. (No. 35.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to *N. Wallich*, Esq., Officiating Secretary to the Tea Committee, dated 24 August 1835.

Sir,

I AM directed by the Honourable the Governor-general of India in Council to acknowledge the receipt of your letter of the 11th instant, submitting further sample of the Assam tea, the leaves of which have been gathered from the wild shrub, but have not undergone a proper course of manipulation.

2. In reply, I am desired to apprise you of the satisfaction which the Government have derived from the further prospect which is thus afforded of the successful result of the important inquiry in which the Committee is engaged.

I have, &c.
Council Chamber, 24 August 1835.
(signed) *W. H. Macnaghten*, Secretary to the Government of India.

EXTRACT INDIA REVENUE CONSULTATIONS, 23 November 1835.

No. 7. From the Members of the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to the Government of India; 12 November 1835.

Sir,

As showing the first operations of the mission, we have the honour to submit to the Honourable the Governor-general of India in Council, an original letter from Dr. Wallich, together with an analysis by Mr. M'Clelland, of different of tea soils from China and Munnipore.

We have &c.
(signed) *J. Pattle.* *C. K. Robison.*
Calcutta *J. R. Colvin.* *Radakant Deb.*
12 November 1835. *C. E. Trevelyan.* *Ram Comul Sen.*

From *N. Wallich*, Esq. M.D., on deputation to Assam, to the Officiating Secretary to the Tea Committee, without date.

No. 8. Sir,

I REQUEST you will do me the favour to inform the Tea Committee, that I arrived here with my party on the 10th of this month.

According to the arrangement made with Captain Jenkins, agent to the Governor-general on the north-east frontier, I immediately informed him of our having reached Chirra, requesting his advice respecting our further movements. His reply, dated at Gowahatty the 20th, reached me yesterday at Mamloo, whither we had proceeded on a tour of examination. It recommends our joining him as soon as we can, in order that we may get into our boats, and go on to Suddeya. He expresses his confident expectation that all hostilities will have terminated before we can reach that principal point of our inquiries, and that we shall be able to pursue these with safety and success. We shall accordingly break ground to-morrow, proceeding to Gowahatty by Myreeng and Runklow, and intending to make every possible inquiry during our progress across the Khoseah hills. That a vast field is still open for us in that direction is obvious, from the extent of the harvest which has already been gathered, and which I am happy to think will satisfy the Committee and the Government that we have not been uselessly employed during our journey to and stay at Chirra. It would be improper to enter into any details of our labours on the present occasion; it may not however be uninteresting to the Committee to be informed, that among a variety of vegetable forms, which this range of hills has in common with the tea provinces of China, are two, perhaps three, species of camellia, and a sort of star anise, resembling that of China in every respect, but in its flavour. These facts are of great importance with reference to the spontaneous growth of the tea in Upper Assam, and most probably also at Munipore. Our botanical and geological collections are already immense, and I venture to hope that they will be found in the highest degree creditable to the indefatigable zeal and research of the two scientific gentlemen attached to my deputation.

I have the pleasure to enclose a report of Mr. M'Clelland, on several samples of tea soils from Munipore and China, which were forwarded by Major Grant and Mr. Gordon; they were analyzed by him on our way to Chattuc.

In requesting that you will do me the honour to submit this letter, and its enclosure, to the Committee, I beg to explain, that I should have reported my arrival here long before now, had I not been desirous at the same time to give some information respecting my further movements, which I was unable to do until I had got the above-mentioned letter from Colonel Jenkins.

I have, &c.

(signed) *N. Wallich*, M.D.,
On Deputation to Assam.

EXAMINATION of SOILS in which the Tea Plant is cultivated in China.

Specimen 1; contained in a small parcel of about an ounce weight, marked "Soil of the Honam Tea Shrubberies;" to which was added, in Dr. Wallich's handwriting, "Received per 'Forth,' from Mr. Gordon, 22d August 1835."

It is salmon colour, loose, and friable. On rubbing it on the palm of the hand it resolves itself into two portions; one consisting of angular grains, which scratch glass; the other adheres to the skin, renders it shining, and feels soft and somewhat meagre.

Having been first bruised greatly and mixed, 200 grains were heated to about 300 Fahr., it only lost four grains of its weight.

It was again bruised and sifted, when sandy parts, with slight adherent dust, amounted to 129 grains impalpable powder; 63, and 2 grains of undecomposed vegetable fibres, were the different results.

The earthy parts were digested in delito muriatic acid for 12 hours, washed and dried, when the remaining insoluble matter amounted to 171 grains.

The acid solution was then treated in succession with prussiate and carbonate of potash, and afterwards boiled, and the different precipitates procured by these means dried and examined.

The parts that were insoluble in muriatic acid were exposed for 20 minutes to the heat of a charcoal fire, and scarcely lost any portion of their weight. They were then boiled for two hours in sulphuric diluted acid*, washed and dried, and were found to have lost 36 grains of their weight. The insoluble parts were found to be chiefly angular grains of quartz, intermixed with fine silicious powder.

From the foregoing experiments, the constituents of this soil may, with sufficient accuracy for agricultural purposes, be stated as follows:

Silex - - - - - - - - -	135
Alumine - - - - - - - -	36
Carb. magnes. - - - - - - -	6
— lime - - - - - - - -	4
Oxide of iron - - - - - - -	13
Roots and fibres of plants - - - - -	2
Water of absorption - - - - - -	4
	200

The following five specimens of soils, sent by Mr. Gordon from the black-tea districts visited by him in China, were received by a previous conveyance; they were contained in distinct papers, consisting of from 200 to 400 grains in each; the whole were enclosed in a small box, and forwarded per 'Emily,' Captain Boothby, to Dr. Wallich.

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* Dilute sulphuric acid.

In ranking these additional soils according to their external characters, they separate into two varieties: the first variety is a yellow colour, composed of concrete masses, which are very friable, and soft between the fingers; the second variety is grey, consisting also of friable masses, and with occasional irregular-shaped pieces of gravel, apparently felspar, hardened, in its decomposed state, by oxide of iron.

A specimen of decomposed felspar, including minute hexagonal crystals of quartz, and spotted with oxide of iron, and a fresh specimen, probably of the same, accompanied these soils. The fresh specimen just alluded to, resembles granite, but has pinite as a basis to the felspar, and quartz instead of mica; the quartz, indeed, is in very small proportion. These geological specimens, no doubt, belong to the rock that affords these soils.

The first variety of these soils comprises two parcels, only distinguished from each other by different degrees of intensity of colour; the one was reddish yellow, approaching to the brightness of the Honam soil already described, and the other was a pale yellow. These specimens may either have been taken from the same, or from distinct plantations; as, however, they were forwarded separately, so also I thought it best to examine them.

(No. 2.)

Besides the colour, it has a great many of the characters of the Honam soil; it feels, however, more uniformly soft, and does not adhere so much to the skin, or feel meagre.

Nearly the same method of analysis was adopted in this as in the examination of the Honam soil: the following are the constituents afforded:

Silex - - - - - - - - -	71
Alumine - - - - - - - -	12
Oxide of iron - - - - - -	7
Carb. lime - - - - - - -	2
– magnes. - - - - - - -	1
Muriate of soda - - - - -	1
Water of absorption - - - - -	3
	97

One hundred grains only were examined of this and the following soils, owing to the smallness of the quantities supplied; it being our wish also to reserve a small portion of each sample for the purpose of comparison with such soils as we may meet in Assam. The same causes, and the want of a sufficient delicate balance, prevented my taking their specific gravities.

(No. 3.)

This soil is soft to the feel, and is composed of very friable nodules, mixed with flat, irregular pieces of gravel. In the course of its analysis, the only peculiarity to be mentioned was, that after having been heated, bruised, and sifted, it afforded 60 grains of impalpable powder; the remainder consisted of minute particles cemented into small grains like soft sand, and on breaking these they were found to be red internally and white without.

The following are the constituents of this soil:

Silex - - - - - - - - - -	68
Alumine - - - - - - - - -	20
Carb. magnes. - - - - - - - -	–½
– lime - - - - - - - - -	–½
Oxide of iron - - - - - - - -	5
Muriate of soda - - - - - - -	1
Water of absorption - - - - - -	2
	97

The three following soils belong to the grey variety already mentioned:

(No. 4.)

This is a light-grey soil, containing irregular earthy nodules of gravel, which on being fractured, look like earthy felspar. Moistened and quickly dried, it becomes somewhat hard and solid, so as to be reduced again to powder, with some difficulty, between the fingers. This peculiarity renders it rough, as if it contained coarse sand, which it does not. Its constituents are,

Silex - - - - - - - - - - -	80
Alumine - - - - - - - - - -	6
Oxide of iron - - - - - - - - -	6
Carb. lime - - - - - - - - - -	2
Alkaline salt - - - - - - - - -	1
Water of absorption - - - - - - -	5
	100

(No. 5.)

The physical characters of this soil are the same as those of No. 4; but the gravel contained in that only amounted to about 3 per cent., while it forms 20 per cent. of this soil. Its constituents are as follow:

Silex, in the state of earthy felspar, variously reduced from the size of gravel to impalpable powder -	83
Alumine - - - - - - - - - -	8
Oxide of iron - - - - - - - - -	4
Carb. lime - - - - - - - - - -	1
Alkaline salt - - - - - - - - - -	1
Water of absorption - - - - - - -	3
	100

(No. 6.)

The whole sample of this soil adhered together, forming a brittle mass of dark-grey colour, with occasional small nodules of gravel, and a few slight undecomposed vegetable fibres, projecting from the surface.

The nodules of gravel present the same external characters as those observed in the last two soils, and constitute about five per cent. of the whole. The ingredients of this soil are,

Silex - - - - - - - - - - -	76
Alumine - - - - - - - - - -	14
Oxide of iron - - - - - - - - -	4
Carb. lime - - - - - - - - - -	2
Alkaline salt - - - - - - - - - -	1
Water of absorption - - - - - - -	3
	100

Note.—The water of absorption has been estimated by the loss of weight sustained when the soil was exposed to such heat as slightly blackened the end of a stick when placed a few minutes in contact with the vessel containing the soil.

As an appendix to the foregoing, I may add the following result of an analysis of the soil of the valley of Moneypore, two specimens of which were transferred to me by Dr. Wallich. One of these had been received by the Tea Committee before Dr. Wallich became its officiating secretary, the other was afterwards received. The first is marked "soil from the eastern side of the valley of Moneypore," the second, specimen of the soil near Sonal, in Alumpore, where the tea (or camellia) seeds were found in Moneypore. *See* Major Grant's letter, 24 May 1835.

No. 1. "From the eastern side of Moneypore." It is of a clear yellow colour; when rubbed in the hand, it adheres to it, and renders it ochre yellow. It is composed of nodules, which may be reduced to the finest powder between the fingers, requiring however considerable exertion. It contains:

Silex	51
Alumine	32
Oxide of iron	6
Carb. lime	2
Water of absorption	9
	100

No. 2. Is a dark, dirty, grey colour, abounding in vegetable fibre. It contains nodules of a much softer nature than the above soil, as well as an occasional fragment of steakito and felspar, but these were only found in a general examination of a considerable quantity of the soil, and may be considered as adventitious. Its constituents are as follows:

Silex	49
Alumine	24
Oxide of iron	8
Undecomposed fibre	1
Animal or vegetable matter destructible by heat	8
Water of absorption	10
	100

I do not know what the prevailing rocks are in the vicinity of these soils, but should infer that they are clay slates. The last soil appears to have received manure, either by natural or artificial means.

Chattuc, 6 October 1835. (signed) *J. M^cClelland.*

EXTRACT INDIA REVENUE PROCEEDINGS, 8 February 1836.

From Major *A. White* to Dr. *N. Wallich*, M.D., dated Jorhaut, 24 Dec. 1835.

My dear Sir,

I HAVE been making inquiries about tea here, and I find that the plant is to be found at a place called Gulroo Purbut, about 18 or 20 miles from this; and the Kacharries, who are the best labourers in Assam, are to be found quite close to the spot; so Rajah Purandur says, who enters heartily into the scheme, and will afford every assistance in procuring labourers. I herewith send a plant, which was transplanted from the hill a short time ago, and I send a number of dried leaves, which were taken from the plants on the hill itself; by making a decoction from them, you will be enabled to judge as to its being the real tea or not; I am inclined to think that it is though, because I am told that two Burmese, or rather Shans, who had given offence to the Burmese Government, and had been compelled to take refuge in the province of Yunnan, taught a man named Boglee to make a decoction from the leaves gathered from the said Gulroo Purbut plant. He is a gardener, and is now employed by Government at Suddya, where you will see him. The two Shans came to Jorhaut with a view of seeking the aid of our Government to re-establish them, and I perfectly recollect their being here.

I have sent out for another plant to the hill itself, and will send it as soon as it comes in. Gulroo Purbut is nearer than Jayee, and I think this of some consequence with reference to the success of an experimental nursery, as it is more within the pale of civilization than Muttock, or the site of the plants discovered in the Singhfo country. I am quite indifferent where the experiment is made; but if Suddya does not answer, I think this would be the best place, as a person superintending the plantation at Gulroo Purbut, might live here during the rains, for I do not think a European could live in the Assam jungles at that season, and from two years' experience I know this to be a salubrious place. Mr. Scott got a boat load of plants from this place early in 1826, and sent them down to Gowalparah and Singamarie; part went to Mr. Swinton. I only knew this to-day. I send a specimen of coal found within half a day's journey of Gulroo Purbut, which might be found useful in the manufacture of the tea.

Your's truly,
(signed) *A. White.*

P. S.—After seeing the Muttock place, I think your best plan would be to come here, as Jayee and Gulroo Purbut must be close to each other.

EXTRACT INDIA REVENUE CONSULTATIONS, 4 April 1836.

From *N. Wallich*, Esq., M.D., on Deputation to Upper Assam, to *J. W. Grant*, Esq., Officiating Secretary to the Tea Committee; 12 February 1836. No. 14 (A.)

Sir,

I BEG leave to enclose a copy of a letter from Major White, political agent in Upper Assam, dated the 2d inst., and of my reply of yesterday, which I request that you will do me the honour to submit to the Committee.

2. As it was originally intended that my deputation should, if practicable, return to Calcatta by Ava, and under the circumstances explained in the above correspondence, I humbly hope that the Committee will approve of the plan of eventually detaching Assistant-surgeon Griffith, to accompany Captain Hannay on his way back to Ava from Suddya; and that they will please to obtain for it the sanction of Government. The unexpected discovery of tea forests in the Bursumaputis and Raja Purundur Sing's territories, within he British influence and control, renders it indispensably necessary that Mr. M'Clelland and myself should proceed on our route to examine them, even if, on the arrival of Captain Hannay on the Assam frontier, it should in other respects be found practicable for the whole deputation to accompany him to Burma; nor will Mr. Griffith be detached until a communication has been received from Capt. Hannay, affirmative on the points detailed in my correspondence with Major White.

3. I take the liberty of enclosing also the copy of a communication from Capt. Jenkins, agent to the Governor-general on the north-east frontier, dated the 25th ult., and of my reply to the same, dated yesterday, relative to detaching Assistant-surgeon M'Clelland, on an important occasion of public interest, humbly hoping that the plan will meet with the Committee's approval. A copy of the letter of the 4th December, to which Capt. Jenkins refers, has been forwarded by him to the Committee. Mr. M'Clelland will, of course, not leave me until we have finished the inspection of the tea forests.

4. We met to-day with the boats that were despatched early in November last from the Botanic Garden, with tea seedlings for Assam. The instruction which I had sent in duplicate to the sergeant who is in charge of the plants, as soon as I had heard of the boats having left Bissenath, had not reached him, owing to the canoes having descended by a different channel of this immense river from that along which the boats were tracking. My orders to him were to halt at the mouth of the Dilroo river, until I should arrive there from my examination of Soyqua and Muttuck, in either of which countries, as I observed in my letter to you of the 29th ult., it would be desirable to establish the plants, in preference to Suddya and Choonpura. The distance, however, of the Dilroo town, the place where the boats have now arrived, not being considerable, they may easily drop down there in one day. I have accordingly ordered Sergeant Moore to halt until he gets further instructions from me. The difficulty of getting a fleet of such heavy boats (of 600 to 900 maunds burthen) much higher up the Berhampooter, at this season of the year, and the impossibility almost of their passing that reach of the river called Sillannee-mook, requiring that they should be changed for other conveyances, render it very desirable to put the plants into a nursery somewhere near the Dilroo, in preference to Soyqua, which is situated beyond the above-mentioned dangerous point.

I regret to say, that a great number of the seedlings have died on their way thus far, owing partly to the protracted durations and difficulties of the journey, the long confinement under Choppar, and the numerous rats which infest the boats, and partly to another circumstance which I shall presently explain. Thirty-four small boxes and two large ones, besides 31 pots, were left behind at Bishenath, as they contained altogether only 213 good plants, the remainder having perished or being in a doubtful state, which enabled Major White to discharge one of the boats, so that only seven are now retained. On examining the cargo of each boat, I found that the seedlings in the pots and gumlahs were generally in a much more healthy and thriving condition than those in the boxes. I attribute this difference chiefly to two causes; first, to the seedlings in the cases being all transplanted, and secondly, to the latter being constructed of teak, and very tightly fastened by means of iron champs, impeding the proper degree of prompt draining of all superfluous moisture, the only outlet being vertical, through the holes made in the bottom of each case, whereby some dampness may have been occasioned. On the other hand, a great proportion of the plants in the pots and gumlahs were of a more vigorous growth, in consequence of being raised from seeds originally sown in them, while the porous nature of the earthenware has admited of a free evaporation or draining of moisture in all directions. The plants being crowded on a larger area in the cases than in the pots, may likewise have had a prejudicial effect; yet I did not observe that there was any perceptible degree of moisture of the soil in the two sorts of receptacles, notwithstanding that so many plants in the boxes appeared to have damped away, as gardeners call it. But with the knowledge I now possess of the great degree of humidity of the climate of Assam, I can readily imagine that common earthen vessels are best suited for holding plants that are to be transported from any distance, not forgetting that there exists at present no other land conveyance in Upper Assam except that which is afforded by means of men. The sergeant has had the whole collection counted over since leaving Bissenath, and it appears that out of the 20,000 plants which left Calcutta, only 8,000 are surviving. Considering all the circumstances connected with so large a consignment of young and tender seedlings, the tallest of them scarcely six inches in height, and supported by the experience of many years, I am of opinion, that the loss of three-fifths is not greater than might reasonably have been expected, the remainder still affording an ample and valuable stock for the formation of a future tea plantation. It is proper to remark, that I have every reason to be satisfied that the sergeant in charge, and the two Maullees who are with him, have performed their duties with great diligence and attention.

6. We left Suddeya on the 6th instant, accompanied by Mr. Bruce, whose local knowledge and experience have already been of the greatest service to my deputation, and made a halt at the mouth of Soyqua Nulla, in order to visit some lands in that neighbourhood. The permanent importance of finishing the examination of the tea forests on our present route to Bissenath, before the termination of the season, prevented our devoting more than one day to Soyqua. We succeeded, however, in selecting a piece of new forest land, which will be available in case we should be disappointed in our expectation of meeting with a better locality in the direction of the spontaneous tea in Muttuck, where an additional advantage would exist on the score of economy. We are now on our way to that country, having been much impeded both in our starting from Suddeya, and in our progress thus far, by continued wet weather since the 2d, and almost incessant heavy rain during the last two days, without the slightest indication of a favourable change taking place soon.

On the Berhampooter,
above the Dilroo River,
12 February 1836.

I have, &c.
(signed) *N. Wallich*, M.D.,
On Deputation to Upper Assam.

No. 14 (B.) From Major *A. White*, Political Agent in Upper Assam, to Dr. *Wallich*, on Deputation at Suddeya; 2 February 1836.

Sir,

I beg leave to forward you an extract of a letter from Captain Jenkins, Agent Governor-general, dated 26 January, for your guidance and information.

Political Agent's Office,
Upper Assam,
2 February 1836.

I have, &c.
(signed) *A. White*,
Political Agent.

Extract of a Letter from Captain *F. Jenkins*, Agent to the Governor-genera in Assam, to the Address of Major *A. White*, Political Agent in Upper Assam, dated 26th January 1836. No. 1.

5. **Should**, however, Captain Hannay consider it proper to return to Ava by the route he came up, I would beg of you to press on him and Dr. Wallich the expediency of Mr. Assistant-surgeon Griffith accompanying Captain Hannay to Ava, for the purpose of adding to the stock of Captain Hannay's information, by those investigations into the natural history of the intermediate countries between Suddeya and Ava, which Mr. Griffith's scientific attainments will enable him to pursue.

6. It seems to me so very desirable to embrace the opportunity of extending our knowledge which now offers itself to us, in the presence of the gentlemen on the tea deputation on our frontier, and Captain Hannay's unexpected deputation, that if Captain Hannay considers himself authorized, from his acquaintance with the feelings of the Burmese towards us, to take Mr. Griffith with him, I conceive that it is so important to the furtherance of the service that one of those gentlemen should pass through the frontier districts of Ava, under Captain Hannay's direction, that this measure ought to supersede any other arrangements, and that Captain Hannay should confine himself to a written communication with you, and proceed to return forthwith to the Resident of Ava, and report his proceedings to that officer.

(True extract.)
(signed) *A. White*,
Political Agent.

From Dr. *N. Wallich*, M. D., on Deputation, to Major *A. White*, Political Agent. Upper Assam; 11 February 1836. No. 2.

Sir,

I **have** the honour to acknowledge the receipt yesterday of your letter of the 2d instant, with the extract from the letter of Captain Jenkins, dated 26th ultimo, accompanying it.

2. In reply, I beg leave to forward the annexed copy of a letter which I have this day addressed to Captain Hannay, to await his arrival at Sudd eay.

3. It would undoubtedly be attended with results the most beneficial to the cause of science, if the recommendation of Captain Jenkins, that Mr. Griffith should accompany Captain Hannay, in the event of his return to Ava by land, could be carried into effect; I confidently trust that the Tea Committee will concur in the plan, and obtain for it the sanction of Government. I need not add, that Mr. Griffith, with that ardour which is inseparable from eminent acquirements in natural history, has expressed his anxious wish to be detached on the contemplated tour.

On the Berhampooter,
above Dilroo River,
11 February 1836.

I have, &c.
(signed) *N. Wallich*, M. D
On Deputation.

From Dr. *N. Wallich*, M. D., on Deputation, to Captain *Hannay*, Commanding the Escort of the Resident of Ava, Suddeya; 11 February 1836. No.

Sir,

I **beg** leave to forward to you, annexed, a copy of an extract from a letter from Captain Jenkins, agent to the Governor-general on the north-east frontier, to Major White, political agent in Upper Assam, dated the 26th ultimo, and received yesterday in a letter from Major White, dated the 2d instant.

2. Agreeing entirely in the views and suggestions of Captain Jenkins, I shall be extremely happy if the circumstances pointed out by him should not stand in the way of your consenting to Mr. Griffith's accompanying you back to Ava,

and thereby affording an opportunity of our acquiring a knowledge of the natural productions of the interesting countries between Assam and Burmah, which the first-rate talents of that gentleman are so capable of supplying.

3. In the event of your concurrence in the above arrangement, a letter addressed to me, on your arrival at Suddeya, will be immediately attended to, and Mr. Griffith would use every exertion to going on there with the least possible delay. The deputation which I have the honour of heading is now proceeding down the river, on the route to several tea forests which are reported to exist near the Dilroo and Dessye rivers, having accomplished the examination of those among the Singphos, towards Beeza. We expect to arrive at Bishenath about the 15th of next month, when our labours, as connected with the production of tea in Assam, will terminate, at least for this season. I request that you will have the goodness to forward your letter to me by outside post until the 1st proximo, and after that time in the Bishenath post-packet, directed to the care of Major White at that station.

4. I cannot conclude without expressing my regret, that circumstances prevent the possibility of my having the satisfaction of meeting you at Suddeya.

I have, &c.

On the Berhampooter, above the Dilroo River, 11 February 1836.

(signed) *N. Wallich*, M. D., on Deputation.

From Captain *F. Jenkins*, Agent to the Governor-General, to *N. Wallich*, Esq., M. D., on Deputation at Suddeya; 25 January 1836.

Political Department, Miscellaneous.

Sir,

WITH reference to the 20th and 21st paragraphs of my letter of the 4th ultimo, I beg to inform you, that, from researches since made as to the mineral products of the line of country there alluded to, I am disposed to consider them of much importance from the information received; so much so, that I beg to request, that if not convenient to you to follow the route pointed out, that you will detach Mr. M'Clelland from Jorehauth to examine the geological formations at the junction of the Dheong and Dunsiri rivers; and placing himself in communication with Ensign Brodie, I should wish him to pass through the Mikeer hills, and proceed to Durrumpore, to examine the coal and lime formations on that quarter, with a view to make an immediate report to Government on their extent and value.

2. If you see no objection to this, I beg you will request Mr. M'Clelland to inform Mr. Brodie of the date at which he may be expected to reach the Dhunzie, in order that this gentleman may direct persons to be in attendance to conduct him to the localities referred to.

I have, &c.

Pol^{l} Agent's Office, N. E. Frontier, 25 January 1836.

(signed) *F. Jenkins*, Agent to the Governor-General.

No. 5.

From Dr. *N. Wallich*, M. D., on Deputation, to Captain *F. Jenkins*, Agent to the Governor-General on the North-east Frontier; 11 February 1836.

Sir,

I BEG leave to acknowledge the receipt of your letter, dated the 25th ultimo, which reached me yesterday.

2. Mr. M'Clelland concurring with me in the importance which attaches to the researches pointed out in your letter, and anxiously desirous of engaging in that pursuit, I trust that, if this season should not admit of his accomplishing all the examinations embraced in your letter, the Government will consent to his being employed on them during next season.

3. You will observe, from my letter of the 6th instant, that Cacharee Hath, near the junction of the Dheong and Dhunsire, is included in the route to the tea forests in Muttuck, and the Rajah's territories. On our arrival there, we shall be better able than at present to form our decision relative to the other

points on which you urge Mr. M'Clelland's attention; but in the meantime I have requested him to communicate with Ensign Brodie, in order that, in the event of his being detached from the deputation, an arrangement may have been formed for joining that officer.

4. In conclusion I beg to observe, that I shall feel extremely happy if the highly meritorious and valuable services of Mr. M'Clelland were to be extended in Assam, even beyond the duration of the present deputation, in the interesting inquiries detailed in your present letter, and your previous communication of the 4th December.

I have, &c.

On the Berhampooter, above the Dilroo River, 11 February 1836.

(signed) *N. Wallich*, M. D., on Deputation.

(True copies.)

(signed) *N. Wallich*, M. D., on Deputation.

(No. 21.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee; 4 April 1836. No. 15.

Gentlemen,

I AM directed by the Right Honourable the Governor-general of India in Council to acknowledge the receipt of your letter, dated the 18th ultimo, and its enclosures, and in reply to communicate to you as follows:

2. His Lordship in Council approves the employment of Dr. Griffith and Dr. M'Clelland, on the special duties described in the letters of Dr. Wallich, there being every reason to expect that valuable information will be obtained by the scientific researches of those gentlemen.

3. With regard, however, to the proposed deputation of Lum Qua, a Chinese physician, on a salary of 400 rupees per mensem, the Governor-general in Council is of opinion, that this amount of expenditure is much too large to be made on what may be termed an experimental arrangement, and that it will be better to send along with the labourers a Chinese carpenter, sufficiently conversant with English, to act as interpreter, and whose services would be more practically useful, and might be obtained on less expensive terms.

4. Should your Committee concur in this view of the case, the Governor-general in Council authorizes you to hire an individual of that description, on a monthly allowance not exceeding 60 rupees per mensem, and to send him, in company with the Chinese labourers, to Assam, in charge of Lieutenant Bigge, or any other officer who may be proceeding in that direction, and who may be directed, on their arrival in Assam, to make over his charge to Captain Jenkins, or Mr. Bruce, until instruction as to the mode of disposing of them can be obtained from Dr. Wallich, to whom you will of course communicate the date on which the party may quit the Presidency.

5. The original enclosures of your letter are herewith returned.

I am, &c.

Council Chamber, 4 April 1836.

(signed) *W. H. Macnaghten*, Secretary to the Government of India.

Ordered, That a copy of para. 4 of the foregoing letter to the Tea Committee be forwarded to the Military Department, from whence the necessary instructions will be issued to Lieutenant Bigge, or any other officer who may be proceeding to Assam, to take charge of the Chinese tea planters, for the purpose therein stated.

EXTRACT INDIA REVENUE PROCEEDINGS, 11 April 1836.

No. 9. From the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Government; 28 March 1836.

Sir,

WE have the honour to submit, for the information and orders of the Right Honourable the Governor-general in Council, copies of the under-mentioned letters, to the address of our late Acting Secretary, Mr. Grant, from Dr. Wallich. You will please to observe, that Dr. Wallich entertains the same view as ourselves of the expediency of employing a Chinese who understands English to accompany the tea planters. He also recommends that an additional number of planters should be procured from China; a measure in the expediency of which we fully concur, and which we have little doubt can be effected under the care of Mr. Gutzlaff, through the instrumentality of the person whom Mr. Gordon employed successfully in procuring those already here. We take this occasion to recommend also, that a Chinese carpenter be hired to accompany the planters to Assam; his services will be required for making tea boxes, and a variety of other work. We understand that the usual wages for a person of this description are 40 rupees a month.

We have, &c.

(signed) *J. Pattle.* *C. K. Robison.*
Ross D. Mangles. *Radakant Deb.*
J. W. Grant. *C. E. Trevelyan.*
Ram Comul Sen. *G. J. Gordon.*

Calcutta,
28 March 1836.

Letters sent herewith:—Dr. Wallich's Letters to J. W. Grant, Esq.: 19th February 1836, 26th February 1836, 3d March 1836, 10th March 1836.

No. 10. From *N. Wallich*, Esq., M. D., to *J. W. Grant*, Esq.; dated Bagdoam, in the Muttuck Country, 19th February 1836; concluded at Rungagora, 20th.

My dear Grant,

ALTHOUGH there is not much prospect of my being able to despatch a letter from Rungagora (the head-quarters of the Bursumaputti), still I will finish one in order that I may be prepared against any opportunity that may occur on our arrival there, which I hope will be to-morrow. On the morning of the 16th, when we started on our march inland from the mouth of the Dilroo, there appeared some change of the weather to be near at hand; but we were deceived, and during the three days' march to this village, we have had incessant rain day and night. This is awfully distressing, considering the rough mode of travelling which we are obliged to adopt, and the horrid jungles we have to pass through. But *jacta est alea*, the object of my mission must be accomplished this season, unless the obstacles should become absolutely insurmountable; my only fear is that the seasons have changed manners, and that the rains have been anticipating their usual period by a couple of months or so, and that this, in fact, is the beginning of them. Such is Assam! But still I hope for better things, and I think there may be a favourable change yet, this being the first afternoon with a fresh southerly breeze and some sunshine during these several days. Yesterday we visited a beautiful tea jungle, a couple of miles from our camp at Nuddooa; as usual, heavy, pelting rain from first to last; still we were highly gratified by our excursion. The spot appears to be very small, although it is very probable that there are others in the same direction. But it was utterly impossible to do more than we did, situated as we were; and there can be no doubt that the jungle ought to be, without delay, appropriated for the purposes of Government, which can be effected with ease and little cost: there are abundance of shrubs, small and large, but no large trees; I mean of the tea; the largest which we saw had been cut down, and had a stem of about five inches in diameter. The soil is of a peculiarly light character, resembling closely that of the tea jungles in the Singpho country, which we have visited. The plants had mostly done flowering; some were still in bud. Some seeds, just commencing to germinate, were found on the ground, and there were abundance of young seedlings. A circumstance which adds very great interest to the occurrence of the shrub here is, that plants are associated with it in these parts which belong also to China, and to the very tea district or provinces of China; two out of three of which have been figured and described by Mr. Brown, in Abel's account of that empire. I cannot tell you how much interest and importance I attach to this curious fact, which will be fully detailed, and I hope satisfactorily, when I am able to submit my report to the Committee; for the present, I must content myself with simply noticing the fact.

To-morrow we proceed to Rangagora, on the route to Tengrae, where, according to all accounts, tea grows in great abundance and perfection. The people who have been sent to us by the Bursunnaputti, as well as others whom we have questioned on the subject, insist on there being tea at no other places than the two I have mentioned above. We have our own men out in all directions to inquire; and if there should be sufficient ground for supposing our informants to be in the wrong, we shall act accordingly; otherwise we intend to adhere to our original plan of proceeding to Gulroo-perbut, in the Rajah's territories, as soon as we have done with Tengaree. The jungles begin to be unhealthy in March, and unless I have done with them early in that month, I shall certainly fall ill, even though my two assistants, who are very young in age, as well as in the country, might perhaps be able to rough the jungles a couple of weeks longer. I hope to be at Bissenath before the 15th proximo, Captain Jenkins having politely complied with my anxious request to meet me at that station, in order that, together with Major White, we might personally consult together on the best plan for taking the tea forest into our immediate management, to be laid before the Committee.

Rungagora, 20 February.

During the evening, and throughout the night, heavy and almost continued rain. We arrived here at eleven o'clock, and shall be on our way towards Tengrae to-morrow or the day after. The Bursunnaputti came out to meet us on our approaching his town or village, and has been very civil to us. He had received a purwannah from the subadahr at Suddeya for a supply of rice, fowls, &c. for a gentleman, who had informed him that he was approaching Suddeya, from Munkaum, and would speedily arrive. This, of course, is Captain Hannay, and I mean to send off an express, as soon as one can be got, with letters for him. On the 11th I wrote to you officially on the subject of Captain Hannay's deputation, and expected arrival, which cannot fail to be productive of the most valuable information, connected especially with the tea forests which abound in the vast countries between Ava and Suddeya.

Believe me, &c.

(signed) *N. Wallich.*

From *N. Wallich*, Esq., M.D., to *J. W. Grant*, Esq., dated Rungagora, on the Dilroo River, in the Bengmora or Muttuck Country, 26th February 1836.

My dear Grant,

SINCE I had the pleasure to write to you on the 20th from this place, we have been at Tengrae, and examined the tea there; we devoted two days to this duty, and were not sorry when they were passed, because a fiercer Turraij jungle cannot easily be imagined, rendered still more unhealthy in consequence of the late long-continued rain.

Owing to a diminution of plants in one direction, leading to their complete cessation, the result perhaps of the clearing of the lands more than to any other cause, Tengrae may be conveniently considered to possess two distinct tea jungles, of very irregular and straggling forms; but, taken together, of much greater extent than all those which we have hitherto seen, put together. One of the tracts is confined in one direction by the Tengaree nulla, which empties itself into the Boree Dihing; the other is partly confined, and partly intersected by several small nullas falling into the Tengaree, and now dry, or nearly so, and in a great measure choked up by vast numbers of bamboos, which latter form a very leading feature of these jungles. As I have already remarked, the boundary of them is very irregular, and therefore not easily defined; the same observation holds with regard to the general level, which is much undulated. The soil is what I could call a good forest soil, of considerable depth, changing below into a sandy and clayey earth. The tea looks remarkably healthy and vigorous, consisting of plants of all ages, between quite young seedlings and tall shrubs of 12, 16 to 20 feet in height, with stems mostly under an inch in diameter, and in no instance reaching beyond two inches; almost all the full-grown plants had abundance of seed-buds; a few had still some flowers on them. They must have been in fine bloom a month ago. The late unseasonable rain has produced a crop of developed young leaves, as well as leaf-buds, while the older foliage was remarkably large, and of a fine dark green colour. I speak here of one of the tracts of forest which I have characterized, by embracing several forest nullahs, for in consequence of the extensive fellings of the large forest trees in that portion which extends along and is confined by the Tengaree nulla, a great number of teas which have fortunately been left unhurt by the dow or cutlass, have, by exposure to a sudden excess of light and heat, had the colour of their leaves changed from a dark, to a pale, somewhat yellowish green colour. Notwithstanding this change, curious in more than one respect, the plants themselves were as numerous and as healthy as those in other parts. In many instances where tea-plants had been cut down, vigorous and frequent shoots were observed to surround the base and top of the stumps that had been left standing on the ground. In some spots the plants were seen in very thick and crowded numbers, in others they were more scattered and remote from each other; at times they were lost sight of altogether, at others recurring again of a sudden; occasionally extending even down the sides of the damp beds of the nullahs or water-courses. Altogether these forests deserve our immediate attention, lest further mischief be done by the ignorant and semi-barbarous hands under which they at present suffer. On my arrival at Bissenath, about the middle of next month, I trust that I shall be able to arrange with Major White for taking the lands under our own care; and I have the more hopes to be able to effect this with ease, having experienced the greatest attention and assistance from the Bursumnaputty, who is the chief of the country. To conclude this brief sketch with an additional most weighty argument in favour of the tea of Assam, I am truly happy to say, that we have found a species of camellia (vulgarly called Japan rose) between Rungagora and Tengaree, so exceedingly like the real Camellia Japonica as scarcely to be distinguished by the form and nature of the leaves; the shrubs had young fruits set, but no flowers. I need not intimate that this plant or shrub is the companion of all teas in China, as well as in Japan.

Your's sincerely,

(signed) *N. Wallich.*

On the Burhampoota, at the mouth of the Dilroo River, the 29th February 1836.

P.S.—In continuation of my letter commenced at Rungagora on the 26th, I add a few lines to say, that we arrived here in canoes from that place yesterday. Sergeant Moore arrived here soon after us, after having safely deposited the cargo of tea seedlings at Seggua, agreeably to the arrangement which I had the pleasure to explain in my official letter to you of the 11th instant. The boats were immediately discharged, and I have ordered the sergeant to proceed forthwith to Calcutta. He states that the plants had improved in a remarkable manner since the time I inspected them, about a fortnight ago. We start to-morrow for Jorhath.

Your's truly,

(signed) *N. Wallich.*

Extract India Revenue Consultations, 11 April 1836.

From *N. Wallich*, Esq., M.D., to *J. W. Grant*, Esq.

Monghyr, at the Mouth of the Dessoy River,
3 March 1836.

My dear Grant,

We arrived here at noon to-day, and to-morrow morning start for Gobroopurbut, for the tea jungles there, about which you will recollect that Major White wrote to me a letter, of which I sent you a copy soon after reaching Suddeya. Our route lies by Jorhath, on the Dessoy river (Dissue in the Company's Atlas, No. 130). We calculate on reaching the spot in three days hence; two days must be devoted to the tea, three back to this ghaut, and from hence two to Bissenath, where we hope to arrive on the 13th, or at farthest on the 14th.

I am most happy to say that Captain Jenkins, in compliance with my anxious wish, has promised to meet me at Bissenath; he has, moreover, invited Raja Purrunder Sing, in whose territories I now am, to join us. We shall thus be able, in consultation with Major White, to form arrangements, for the approval of the Committee, regarding the spontaneous tea, both in the Raja's dominions and in those of the Bursumaputy. I find a number of boats and other preparations at this ghaut for the conveyance of Purrunder Sing to Bissenath.

Soon after arriving here I had the satisfaction of receiving your letter of the 10th February; accept of a thousand thanks for it; more than I can tell you does your intimation gratify me, that the Committee are pleased with my examinations as far as they had become acquainted with them, namely, as far as the Kooja forest, among the Singfoos. From my subsequent letter, especially since I have visited the highly interesting and promising forests in the Bursumaputy's country, I hope and trust that the Committee will derive still greater satisfaction. No scheme of this nature was ever entered upon with such a progressive accumulation of favourable and confirmatory circumstances as our tea scheme; instead of trying by experiment whether or not the tea would grow in the Company's dominions, which, please to remember, was the bias and object of the formation of the Committee, we soon found out that the plant was indigenous among the Singfoo, the true, real, only, China plant. Immediately on my arrival in Upper Assam I learnt that Mr. Bruce had discovered that there were tea jungles both in Muttuck and in the direction of Jorhath. The former we have already examined, and found most valuable, I mean those in Muttuck. Those at Gobroo still remain to be inspected; and reports from Major White, as well as from Mr. Bruce's men, incline me to expect something equal, if not superior, to what we have already seen. We have thus the ready means of acquiring possession of natural tea forests, which will enable us, with far less expense than was contemplated, and with next to positive certainty of success, to put the matter to a direct and immediate test. How widely different the conditions under which the introduction of tea into Penang by the English, into Ceylon and Java by the Dutch, and into the Brazils by the Portuguese, has been, and is attempted.

I anxiously hope that we shall have many more China cultivators besides the three that have already reached Calcutta. In the meantime, the sooner that these men are sent up to Assam the better, I should think. It may perhaps be advisable to let them be accompanied by a Chinaman of Calcutta, by way of an interpreter.

I write these lines in much haste, not expecting that there will be here an immediate opportunity for despatching a dawk to Bissenath. I am happy to say that my cold has entirely left me. I wrote to you on the 29th ultimo, but I verily believe I forgot to thank you for your kind favour of the 27th January. We met yesterday the American missionaries and their families (Drs. Cutler and Brown); they are on their way to Suddeya, and seem very good people, and are highly spoken of as such.

Your's most obliged,
(signed) *N. Wallich.*

I also wrote an official letter to you yesterday, sending our bills under the same cover with this.

No. 11. (No. 22).—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee: 11 April 1836.

Gentlemen,

I AM directed by the Right Honourable the Governor-general of India in Council to acknowledge the receipt of your letter, dated the 28th ult., submitting communications from Dr. Wallich, who recommends the employment of a Chinese who understands English, to accompany the tea planters to Assam, and to procure an additional number of planters from China, which can be effected through the Rev. Mr. Gutzlaff, also recommending that a Chinese carpenter accompany the planters, upon a salary of 40 rupees per month.

2. You have already received instructions in my letter, No. 21, dated the 4th instant, on the subject of an interpreter and carpenter to accompany the Chinese labourers, and you have been authorized to incur an expenditure, on this account, not exceeding 60 rupees per mensem.

3. With regard to the question of procuring additional labourers from China, his Lordship in Council is of opinion, that the consideration of it had better be postponed till the return of Dr. Wallich to the Presidency; when, should an additional supply be deemed necessary, the most efficient and economical means of procuring them may be resorted to.

I have, &c.

Council Chamber,
11 April 1836.

(signed) *W. H. Macnaghten*,
Secretary to the Government of India.

EXTRACT INDIA REVENUE CONSULTATIONS, 18 April 1836.

No. 2 From the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Government; 14 April 1836.

Sir,

WITH reference to your letter of the 4th instant, No. 21, conveying the sentiments of the Right Honourable the Governor-general in Council, regarding the employment of a competent person to act as a medium of communication with the Chinese tea planters about to proceed to Assam, we have now to request the favour of your stating to his Lordship in Council our regret that we have not been able to carry into effect his Lordship's suggestions to their full extent.

The dialect spoken in that part of the province of Fahkeen bordering on Kyangse, of which those people are natives, differs very materially from that spoken on the coast of the same province, as well as from that of the province of Canton, insomuch that it is only through the medium of the written character, that natives of those respective districts can make themselves mutually understood. Fortunately, however, the dialect of the Bohea hills approaches, in point of purity, to that of Nankin, which is the standard or literary dialect, so that it may be pretty well understood by natives of the other provinces who have some knowledge of classical pronunciation. This difficulty will account for our want of success in the endeavour to find a person, qualified to act at the same time as carpenter and interpreter. We learn upon inquiry, that there are few if any Chinese carpenters in Calcutta, who are not natives of Canton; and that these are totally illiterate and unable to understand, or to make themselves intelligible, to the Bohea men.

We have therefore been obliged to seek some other arrangement, and we deem ourselves fortunate in having fallen in with a person who, though much inferior in point of intelligence to Dr. Lum Qua, whom we formerly proposed, may be found sufficiently qualified for the purpose for which his services are required, and may be engaged on much cheaper terms.

The individual alluded to, named Laou Chung, was formerly employed in the licence department of the police, on a salary of 80 rupees per month. He is understood to have given satisfaction while so employed; but resigned the situation to engage in trade, which he has pursued for some years, and which he is unwilling to relinquish unless for an appointment of some permanence. The lowest terms on which he consents to proceed to Assam, are 100 rupees a month, for three years certain. He speaks English pretty well, and can read a plain hand; his own language he reads and writes fluently, and is conversant with several of its dialects; and may thus eventually be found useful in case of any Chinese of the adjoining province of Yunnan visiting Assam with a commercial view.

A carpenter of good character has offered his services, at 45 rupees a month; he originally demanded 40 sicca rupees and his victuals. We would recommend the fixed sum of 45 Company's rupees to be allowed to him in preference.

We have further to request the favour of your obtaining the orders of Government for an advance of three months' wages to the tea planters, as submitted in our letter of the 1st instant, and also to the individuals we now propose should be entertained, should our recommendation be sanctioned.

We have, &c.

(signed)	*J. Pattle.*	*Ram Comol Sen.*
	Ross D. Mangles.	*J W. Grant.*
	C. E. Trevelyan.	*Radhakant Deb.*
	C. K. Robison.	*G. J. Gordon.*

Calcutta, 14 April 1836.

(No. 30.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee; 18 April 1836. No. 2.

Gentlemen,

I AM directed by the Right Honourable the Governor-general of India in Council to acknowledge the receipt of your letter, dated the 14th instant, reporting the failure to arrange for a Chinese interpreter on the terms suggested in my letter of the 4th instant; but that a person is available at a salary of 100 rupees per mensem for three years certain, and a carpenter at 45 rupees per mensem, also recommending their employment, and that they should receive three months' pay in advance.

2. In reply, I am directed to acquaint you, that his Lordship in Council has been pleased to sanction your employing the individual in question on the monthly allowances suggested; but that the contract to retain the interpreter for a period of three years, must be clearly understood as being subject to the condition of his conducting himself properly and satisfactorily.

3. The advance of three months' pay solicited for the individuals in question, is authorized, and will be paid to your order on application at the General Treasury in the usual way.

Council Chamber,
18 April 1836.

(signed) *W. H. Macnaghten*,
Secretary to the Government of India.

Ordered, That the necessary communication be made to the civil auditor and sub-treasurer respectively.

EXTRACT INDIA REVENUE CONSULTATIONS, 16 May 1836.

From *G. J. Gordon*, Esq., to the Chairman and Members of the Tea Committee; 29 April 1386. [illegible] 4

Dear Sirs,

I THINK it right to take the occasion of the happy return of Dr. Wallich amongst us, to inform you, that in pursuance of the intention I have already expressed, I will, with the expiration of the present month, resign my office of Secretary to the Committee. I am induced to take this step by considerations, partly public and partly private.

The investigations assigned to our Committee on its first formation have been completed, and the objects especially entrusted to myself for execution have been effected. Nothing in fact is now wanted but Dr. Wallich's report, and my own, to satisfy Government and the public, that there are situations within the Company's territories in which tea can be cultivated with every prospect of success.

Persons qualified for superintending the culture and manufacture of that species of tea which forms the great bulk of consumption, I mean black tea, are already on their way to the province of Assam, where they can ascertain the quality of the indigenous plant, and direct the cultivation of the foreign stock imported from China.

Those great objects having been effected, nothing further remains that can demand the undivided labours and attention of a secretary, and it does not appear to myself proper that I should, under such circumstances, continue to burthen Government with a salary allotted to me, when I was required to perform more onerous duties than now remain to be executed.

Such are my public grounds for tendering the resignation of my office of Secretary. I have only to regret that my private circumstances are such, that I cannot afford to devote gratuitously, even to an object in which I feel so lively an interest as in that in which your Committee is engaged, such portion of my time as would still be required for that duty, otherwise my best services in that capacity would continue to be at your disposal, and that of Government.

I have, &c.

Calcutta, 29 April 1836. (signed) *G. J. Gordon.*

EXTRACT of Proceedings at a Meeting of the Tea Committee, held at the Office of the Sudder Board of Revenue, on Friday the 29th April 1836.—Present, Mr. Pattle in the Chair, Dr. Wallich, Mr. Trevelyan, Mr. Robison, Mr. Grant, Mr. Gordon, and Baboo Radhacant Deb.

8. ON perusal of the Secretary's letter, the Chairman submitted the following resolution, which was adopted by the Committee:

Resolved, That it will be but just to Mr. Gordon to express to Government the very great and uniform satisfaction we have derived from the zealous, judicious, and indefatigable exertions he has employed, at times exposed to severe privations and risk, to ensure the successful execution of the important objects for the accomplishment of which he was twice deputed to China. He had necessarily to contend with great difficulties from causes beyond his control. That disappointment, therefore, should to a certain degree occur, must have been anticipated by us all; but, we can with truth declare, that no exertion of judgment, or personal effort, has been omitted by Mr. Gordon that could tend to secure success. Mr. Gordon is, therefore, fully entitled to our commendation and thanks, and that we should notice to Government his just claim to the distinction of their approval of his labours.

9. The services of a Secretary being indispensable, and as we have all official duties which demand the whole of our time, it is expedient that we request Mr. Gordon to continue his services till Dr. Wallich shall have finished his report, and till we shall have submitted it with our sentiments to the Government of India. Should Mr. Gordon assent to our wishes, we will address to Government the expression of our sentiments in respect to the services of Mr. Gordon, with a suggestion that Doctor Wallich may, in succession to Mr. Gordon, be requested to assume the office of our Secretary.

Resolved, That the foregoing resolution be communicated to Mr. Gordon, in order that the Committee may be in possession of his answer before addressing Government.

(signed) *J. Pattle.* *C. K. Robison.*
R. D. Mangles. *Radhakant Deb.*
C. E. Trevelyan. *N. Wallich.*
J. W. Grant.

EXTRACT INDIA REVENUE CONSULTATIONS, 23 May 1836.

No. 2. From the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to the Government of India; — May 1836.

Sir,

WE have the honour to transmit copy of a letter addressed to us by Dr. Wallich, on the 28th March last, enclosing copy of his letter of the 15th March to Captain Jenkins, political agent at Assam, recommending the immediate adoption of certain measures for securing the advantages contemplated from the discovery, that the tea-plant is indigenous in several parts in the province of Assam.

2. We learn from Dr. Wallich, that there is considerable variety in the appearance of the plant, as well as in the quality of the soil in which it is found at those several places respectively; and it is, therefore, very desirable, that all of them should be subjected to the test of experiment, as there are no indications that can in the present state of our knowledge of the subject point to any one of those spots as more likely to produce good tea than any other of them, or which ought to be preferred on any other account.

3. We entirely concur with Dr. Wallich in thinking, that justice will not have been done to the inquiry, unless the wild plant be placed in circumstances as nearly as possible resembling those in which the cultivated plant yields the best produce, and that no fair judgment can be formed as to the value of the indigenous plant, unless the trees, climbers, &c. growing on the same spot be cleared away, the ground drained, and the plants themselves trimmed, or cut down, so as to secure the springing out of a number of fresh twigs and branches that will thus be subjected to the influence of free exposure to the air and sun. We know, from the unanimous testimony of all those who are acquainted with the tea countries of China, that those conditions are essential to the good quality of the leaf.

4. It is estimated by Dr. Wallich, that the possession of the small patches of forest land to which he alludes, may be obtained for a few hundred rupees each, so that the whole of them might probably be acquired for a sum not exceeding 1,500 rupees. A further sum of 4,000 or 5,000 rupees he conceives would suffice to cover the cost of the operations described in the 9th paragraph of his letter of 15th March, addressed to Captain Jenkins. Regarding so small an outlay as quite inconsiderable compared with the importance of the object in view, we have no hesitation in strongly recommending to Government to place that sum at the disposal of Captain Jenkins, as applicable to the purposes recommended by Dr. Wallich.

5. As it will be necessary to employ a competent person for the superintendence of the operations above recommended, we deem it fortunate that the services of one so eminently qualified for that duty, as the gentleman named in the 10th paragraph of Dr. Wallich's letter, can be obtained on the spot. We understand that Mr. Bruce, the gentleman alluded to, would resign the charge of the gun-boats which he now holds, as well as his private business, and devote the whole of his time and labour to the care of the nurseries, and the proposed experiment on the indigenous tea plant, for a salary of 500 rupees a month, and this allowance we would propose to have a retrospective effect from the 10th of January last, when Mr. Bruce first gave his assistance to the deputation headed by Dr. Wallich.

6. The salary above proposed for Mr. Bruce, it is intended shall include his travelling expenses, which, considering that the spots which would be under his charge spread over a very extensive tract of country, cannot but be heavy.

7. A moderate establishment of labourers and chowkedars will be required at each forest, after the most pressing works alluded to above have been accomplished; but this subject will be more fitly laid before the Government at a future period, when the necessity for this expense arises.

We have, &c.

(signed) *J. Pattle.* *C. K. Robison.*
Ross D. Mangles. *Radhakant Deb.*
Ram Comul Sen. *N. Wallich.*
J. W. Grant.

Calcutta, May 1836.

Encl. to No. 3.

From *N. Wallich*, Esq., M.D., on Deputation, to Captain *F. Jenkins*, Agent to the Governor-general North-east Frontier; 15 March 1836.

Sir,

THE time has now arrived when I should lay before you my sentiments relative to our taking the tea forests, which have been examined during my deputation, under our own management. I have already had the honour to address you privately on the subject, and shall therefore confine myself entirely to an outline of the plan which I have in view, the more so as its details belong properly to the official report relative to the tracts in question, and, generally, on my proceedings during the deputation, which shall as soon as possible be submitted to the Tea Committee.

2. On the present occasion, it will be sufficient to enumerate briefly the places where we examined the tea in its natural or wild state:

1st. At Koojo.
2d. Near Niggroo, on the Booree Dehung, among the Singfoo.
3d. Near Nuddooa, } In the Muttuck country.
4th. At Tengrae, }
5th. At the foot of the Nagu range, at Gubhroo, in the Rajah's territories.

3. I beg leave to observe, that at the time when I left Calcutta, on my present tour, the Committee were not in possession of any data on which they could found a supposition that tea existed anywhere in this province, except on its remotest frontier to the southward and eastward of Suddeya. It was not until I reached Assam that I heard from you that forests were to be met with lower down the Berhampooter, in countries subject to British control and influence. We have fortunately been able to examine all these forests personally, as far as we had any positive knowledge of their existence.

4. As far as regards the forests among the Singfoo. I am confident that it was never contemplated as practicable to get possession of them for public purposes. Indeed, the views of the Committee with regard to my mission, unless I am greatly mistaken, were limited to my simply examining the Singfo forests, and selecting proper sites for tea plantations within our own territories. I am warranted in believing that we may get possession, not only of those forests, but of all the others which I have mentioned above: and that, by adopting this measure, the number as well as sites of the intended plantations may be considerably modified.

5. In my humble opinion, the gamers or chiefs who own the Singfo tea tracts, will not object to our purchasing or leasing them. Such a measure would, moreover, have a very beneficial effect on the tribe; it would improve and strengthen the impression which, I trust, my party has left among them, that there are other objects than those of war and punishment which may bring them into close contact with their neighbours. But setting aside these considerations, there is a great probability that the tea in the two forests in question has originally travelled from the frontiers of China, where it has been recently proved that some of the most valuable trees, in the estimation of the Chinese, are produced.

6. The forests in the Bursunnaputtis and the Rajah's territories are also highly interesting. That at the foot of the Nagas range, which we found growing on one of the small hills of the cluster which bears the name of Gubhroo-purbut, it is reasonable to suppose is connected with others extending to the southward among the Nagas, and with the tea which Major Grant has announced as existing in Munnepore, and which may have originated from the Hookum plant.

7. Under the preceding views, I most anxiously recommend, that all the tracts which I have enumerated above should be put under a systematic course of management in our own hands, in order that we may be enabled, with far less cost, and with vast saving in point of time, compared to what would be the case were we to depend exclusively on artificial plantations, to arrive at a satisfactory conclusion as to the capability of the Assam tea of yielding a good and merchantable produce. At the same time, I beg to repeat, what I

have already had several occasions to intimate to you before now, that I suspect we shall have to ascend much higher elevations than those where the tea has been hitherto seen in Assam, to meet with localities subject to a decided winter of six weeks or two months' duration, before we can expect to find the more valued and superior sorts of teas, and that it is to such localities that we must chiefly direct our attention in the establishment of our new plantations. But since it is the ordinary description of article which ought to be considered at present as the principal object of our endeavours, I mean that sort of tea which is cheapest of all, and for the consumption of which, like that of sugar, it may be assumed there is no other limitation than what is caused by the price it bears in the market; and since all varieties of tea in commerce are derived from one and the same parent stock, probably not even excepting the two grand divisions of black and green teas, I do maintain, that the Assam forests hold out the fairest prospects, that, under a proper treatment, they may be made to yield a very valuable supply of good and potable tea, which will before long repay all the expenses of the preliminary trials, provided the leaf is made to undergo the same sort of manipulation which is practised in China, and which so entirely differs from that in use among the Singfos and our other neighbours.

8. Nothing could be more favourable for the object I have in view in addressing you these observations, than the fortunate circumstance of my having the honour of meeting you at this station with Major White, since, in case you should coincide with me in opinion, that the forests ought to be taken into our own hands, the preliminary steps may at once be adopted for giving full effect to the scheme, in case it should be finally sanctioned below. Nor can I omit noticing the opportune presence at this moment at Bishinath of Rajah Purunder Singh. Without presuming to offer any opinion on the mode in which the object may be attained, I would suggest, that procuring the forest lands on a long lease might, probably, insure all our purposes. Considering, however, the destructive manner in which the tracts in question have been hitherto treated by the natives, and the injuries which most of them are at this time almost daily undergoing, I beg most earnestly to urge the necessity of immediate and effective measures being taken to secure the forests from further spoliation, pending my reference to the Tea Committee.

9. As none of the jungles are very large, I would recommend that a strong fence should be put round each, to protect them from encroachment and depredation from man and beast; such a durable fence as has partly been constructed near the Tengral tea forests, for the security of that part which has been cleared for the cultivation of opium and rice. The materials for raising such a fence are at hand everywhere. As much as can be done during this season, the tea plants should be relieved from the thickest jungle of shrubs, climbers, &c., which at present overwhelm them, and which is very destructive; leaving the large trees, which form so conspicuous a feature in these jungles, for future thinning and removal. A number of labourers should be entertained, to dig and level the ground, whenever it is required, and to drain the lands at places where there is any fear of severe floodings. It will be necessary also to have some teklas or choukedars, to guard the tracts from the plants and seeds being robbed, &c.

10. It is of the utmost importance that a trustworthy and properly-qualified person should be nominated for the charge of the forests, and for carrying into effect the above provisional and subsequent steps; and whose duty it should be to visit the forests frequently and in succession, and to report upon their progressive condition. Believing it to be impossible to find a man equally qualified with Mr. C. Bruce, in point of experience, zeal, and bodily constitution, it is my intention to recommend that gentleman, in the strongest manner I can, to the Tea Committee, for the charge of the Assam forests: the more so, as I have every reason to believe that you agree with me entirely in this matter. It was Mr. Bruce, and his late brother, Major R. Bruce, at Jorehath, who originally brought the Assam tea into public notice, many years ago, when no one had the slightest idea of its existence; a fact to which the late Mr. David Scott has borne ample testimony; and it is to Mr. Bruce's indefatigable exertions that the Muttock and Gubhroo forests have come to light. His long residence

in Assam, his intimate acquaintance with the customs, languages, prejudices, &c. of the many tribes that inhabit the province and the adjoining countries, the excellent moral character which he deservedly bears among us all, his extraordinary strength of constitution, which has enabled him to encounter the fiercest jungles, at seasons when it would be fatal to any one else to come near them; all these considerations combine to render him eminently qualified for the duties in question. Mr. Bruce has accompanied my deputation from the 10th of January to this day in all our excursions; and I am doing nothing but an act of plain justice to that worthy and useful man, if I declare that, whatever may have been the success which has attended my mission among the various tribes in Upper Assam, and I do humbly trust that I may claim for it some degree of success, it is to Mr. Bruce's unwearied exertions and advice during our journeys, his conciliatory demeanor towards the natives, his intimate knowledge of them and of their country, and the strong interest which he has unceasingly taken in the tea scheme, that I am bound mainly to attribute that success. In short, when I reflect on the peculiar predicament in which the frontier was placed, when I and my party arrived at Suddeya, you will no doubt agree with me in thinking that I could have done very little if I had not had the advantage of Mr. Bruce's personal assistance. Being already in charge of the nurseries at Suddeya, he has a further claim to favourable notice on this occasion; and the mere fact of his having so long resided in this part of India, and being able to endure the climate at all seasons and in all localities, give him a decided advantage over any person, however qualified, who might be sent up from Calcutta, but who would soon experience the deleterious effects of an Assam jungle.

11. I shall of course submit this matter to the consideration of the Tea Committee, with whom it will rest to recommend Mr. Bruce for the situation, with such a scale of allowance as will enable him to devote all his time and abilities to the charge. In the meantime, I consider his services as indispensably necessary, even for carrying the above preliminary measures into execution; and under this impression, I have ventured to dwell at length on his permanent appointment. It occurs to me, however, that his present charge of the Suddeya gun-boats would be incompatible with the proposed superintendence of the tea forests.

I have, &c.
(signed) *N. Wallich*, M.D.,
On Deputation.

Bissenath, 15 March 1836.

EXTRACT INDIA REVENUE CONSULTATIONS, 23 May 1836.

No. 4.

(No. 42.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to Captain *F. Jenkins*, Commissioner of Assam, dated 23 May 1836.

Sir,

To secure the advantages contemplated from the discovery that the tea plant is indigenous in several parts of the province of Assam, certain measures have been recommended to Government for adoption by the Tea Committee. These measures may be enumerated as follows:—

1st. To obtain, by purchase or otherwise, tracts of forests in the Singfo, Muttock, and Gabhroo hills.

2d. That the tracts be placed under a systematic course of management, for establishing tea plantations.

3d. That the tracts be protected, by a strong fence, from encroachment and depredation of man and beast.

4th. That labourers be entertained to dig and level the ground, and drain lands at places where there is fear of severe flooding.

5th. That choukedars be hired to guard the tracts, to prevent theft of plant and seed.

2. To the Governor-general in Council it appears that it would be premature to enter at present upon so extended a scale of operations, and it might be preferable, in the opinion of his Lordship in Council, to confine our proceedings

to two or three spots, selected on account of the convenience of the position, and with reference to the variety of soil required for the different species of plants.

3. I am desired to request that you will submit a report of your sentiments as to the most eligible places to be used for this purpose, and the measures you would recommend to be adopted in the prosecution, on the limited scale, of the objects contemplated by the Committee, and the expense which it is calculated will be incurred in obtaining the patches of forests, and in inclosing and dressing them in the manner proposed by Dr. Wallich.

4. The appointment of Mr. Bruce, as superintendent, with a salary of 500 rupees per mensem, as proposed by the Tea Committee, does not appear to be objectionable, but his Lordship in Council is of opinion, that the establishment proposed to be attached to him is much larger than he would be justified in allowing, both in regard to the early stage of these proceedings, and to the scale upon which he thinks this should, in the first instance, be prosecuted. You are, accordingly, requested to submit a report on this point also, (showing what reduction can be effected,) for the consideration of his Lordship in Council; on the receipt of which, final orders will be issued regarding the employment of Mr. Bruce.

5. Copy of the letter to my address from the Tea Committee, and of its enclosures, is sent herewith for your information.

I have, &c.

(signed) *W. H. Macnaghten*,
Secretary to Government of India.

Fort William,
23 May 1836.

Ordered, That a copy of the foregoing letter to the address of Captain Jenkins be forwarded to the Tea Committee for their information.

EXTRACT INDIA REVENUE CONSULTATIONS, 20 June 1836.

From Major *A. White*, Political Agent, Upper Assam, to Captain *F. Jenkins*, Agent to the Governor-general, Assam; 30 May 1836.

Sir,

I BEG leave to forward copies of two letters from the Bur Senaputtee regarding the tea forests discovered within his territory, by which you will perceive that he is willing to make them over to Government unconditionally, for the prosecution of the experiment, and is ready to supply labourers, a guard, &c.

2. By his second reply you will further perceive, that he declined giving a qubooleeyat for these lands, on the ground that he had already fully acknowledged that the British Government was lord paramount of the soil, consequently might lay claim to any unoccupied lands within his territory.

With reference to this feeling on his part, I am inclined to think it preferable that the arrangement should remain on the footing he wishes it, the more particularly as he has suffered no pecuniary loss on the occasion, and may eventually benefit by it.

3. I regret to mention, that the Koochwo and Nugroo Gaums have as yet not made their appearance at Suddeya, for the purpose of treating regarding the tea forests discovered within their respective tracts of territory. I apprehend this is to be ascribed to some latent distrust on their part in consequence of their having been connected with the Duffa Gaum, although I had made every exertion to dissipate it by making Mr. Bruce the organ of communication on this occasion, who had been intimately acquainted with them prior to the Duffa Gaum's incursion, and has since been on friendly terms of intercourse with them consequent on Dr. Wallich's visit.

However, I trust that their reluctance to come in will be overcome prior to the arrival of Dr. Lumqua and the Chinese, and that thereby nurseries will be established in the three different localities where the tea plant has been found.

Political Agent's Office,
Upper Assam, Bishnath,
30 May 1836.

I have &c.
(signed) *A. White*,
Political Agent.

(True copy.)
(signed) *Francis Jenkins*,
Agent to Governor-general.

Ordered, That the Tea Committee be informed that the foregoing information appears to be very satisfactory.

EXTRACT INDIA REVENUE CONSULTATIONS, 11 July 1836.

No. 6. (No. 157.)—From Captain *F. Jenkins*, Agent to the Governor-general, North-East Frontier, to *N. Wallich*, Esq. M.D., late on Deputation to Assam, dated 5 May 1836.

Sir,

WITH reference to my letter to your address of the 25th March, I have the honour to forward a copy of my letter of the same date to Major White, on the subjects proposed for my consideration in your letter of the 15th March, and a copy of Major White's letters of the 27th and 28th ultimo, with the documents annexed, as per note below.*

2. You will be glad to learn from Major White's letter of the 27th April, that Rajah Poorunder Sing makes no hesitation in placing the Gubroo hill at the disposal of Government: but he is anxious to retain one-half of the hill, that he may carry on the cultivation of the tea plants, on that half, simultaneously with us on the other, and that the superintendent and overseers of the Government should instruct his people in the management of the plant and manufacture of tea.

3. It is very desirable to carry with us, in the important measure before us, the goodwill of all the native chiefs, and the proposals of Rajah Poorunder Sing appear to me so perfectly unobjectionable, that I should have no hesitation in recommending our complying with his wishes, if it were only as an equitable remuneration for the use of half the hill.

4. There are however stronger reasons in my opinion for accepting his offer on his own terms. I do not contemplate the Government wish to do more themselves than to show the feasibility of producing a marketable tea within our own provinces, and thence I should judge that the sooner they can abandon the proposed tea plantation to private enterprise the better.

5. This is secured I conceive by the plan proposed by Poorunder Sing. To be taken into a sort of joint partnership, in the first expense of the tea plantations is, I think, most favourable to the views of Government, as it will ensure his zealous assistance in the undertaking, and will more quickly prepare the way for the Government to give over to others the prosecution of the contemplated plantations.

6. Major White's letter of the 28th April, and accompaniments, announce the terms on which Mr. Bruce is willing to undertake the superintendence of the tea forests, viz., on a personal salary of 400 rupees a month, with two assistants, writers, and such establishments as may be hereafter found absolutely necessary.

7. The salary Mr. Bruce proposes for himself is in my opinion very moderate, on the supposition that he devotes his entire leisure to the duties of this charge. From a long personal knowledge of Mr. Bruce, I am enabled to coincide entirely with you in the high opinion you express of Mr. Bruce; his unwearied activity,

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* Extract of a letter from Major White to Lieut. Millar, dated 30th March; Lieut. Millar's reply, [illegible]th April. Mr. Bruce's letter to Lieut. Millar, 14th April. Rajah Poorunder's letter to Major White, 13th.

his great good temper, with a knowledge of the natives, and his physical ability to stand any fatigue and exposure, could hardly be found combined in any individual. Of his other qualifications, I may mention, that I should have the most perfect confidence in his trustworthiness, and in his zeal to forward by every means in his power the objects of Government. I may only add my conviction, that it is absolutely necessary to avail ourselves of his services in some capacity or other, for without his aid, I would not say that the scheme would not succeed, but I am perfectly satisfied that it would be greatly retarded and intercepted.

8. In regard to Mr. Bruce's proposal to have two assistants; this I should also consider requisite; I can hardly say what might be adequate salaries for them; but probably for the

First assistant - - - - - - -	100
Second ditto - - - - - - -	70

To these appointments I know of only one qualified individual in the province, disposable, and that is Capt. Bruce, now commanding Rajah Poorunder Sing's militia; a situation which I am aware he is anxious to give up. Capt. Bruce is a nephew of Mr. Bruce, was born in this province, and enjoys in great measure his uncle's constitutional strength, and a perfect acquaintance with every part of Assam. I would beg to propose him as first assistant, and for the second I would recommend that some individual should be sought out who has a practical knowledge of agriculture and horticulture.

9. I am unable to give any opinion as to the extent or expense of the other parts of the establishment; but this may be intrusted to Mr. Bruce. Two elephants I should consider necessary; they should be bought in the province; and the pair would be purchased here for about 300 rupees; the *bonâ fide* charge for which Mr. Bruce should charge in his bills; I think it would not exceed 10 rupees a head per mensem.

10. You will be gratified at perceiving from Mr. Bruce's letter, that he has ascertained the existence of another tea tract near Fingry, in the Muttock country.

11. Nothing more, I think, remains for me to say at present, than that I would beg to call attention to the services that Mr. Bruce has already performed in accompanying your deputation, and to recommend that if appointed superintendent on the salary proposed, that his salary should commence from the time of your arrival at Suddeya, deducting the amount he has in the meantime received as overseer of tea nurseries.

I have, &c.

Political Agent's Office,
N. E. Frontier, 5 May 1836.

(Signed) *F. Jenkins*,
Agent to the Governor-general.

From *C. A. Bruce*, Esq., Commanding Gun Boats, to Lieutenant *J. Millar*, Commanding at Suddeya, dated 14 April 1836.

Sir,

In reply to yours of the 13th May, I beg to say, that I shall be most happy to undertake the superintendence of the tea forests for 400 rupees per month, provided I am allowed an adequate establishment for the same. As the distance is so great from the easternmost to the westernmost tea jungles, I should think it necessary to have two European or Anglo-Indian assistants, with a native writer to keep accounts in English, and a molly at each place, as also a taclah and some runners to carry orders; a couple of elephants and some canoes would also be necessary; as to the number of hands required it would be impossible to specify, but no more shall be employed than is absolutely necessary, and Government may rest assured that strict economy shall be my aim.

With respect to the tea at Khegoo and Nugroo, it would be as well to follow Major White's plan; for myself, I have little hope of making anything in that quarter as long as the Duffa Gaum is at large. After a large outlay, a sudden incursion of these people may sweep all away in the course of an hour; so it would be as well to leave that alone until more favourable times.

I am most happy to inform you, that it has been reported to me that there is more tea near Fingry in the Muttock country. I have not had time to examine or send there, as there is such a scarcity of men at this place that I have not sufficient to look after the nurseries under my care here and at Chykook; Government ought to encourage people to settle here.

If Government wish Chinamen to cultivate tea, I might probably be able to get some from the nearest China frontiers; at all events I could but try it if Government wished; some advances would be required to give the men, to induce them to go.

One thing I would wish to bring to your notice, which is, that it is and ever has been a custom among the Assam Rajahs never to tax or take any rent from any one that would take the trouble to cultivate hills; so if we clear the hill of Gabroo, now a thick jungle, where the tea is, the Rajah could not in equity ask one rupee for it, or any other hill that may hereafter be discovered with tea on it; he ought to be satisfied that a large sum of money annually comes into his country.

I have, &c.

Suddya, 14 April 1836. (signed) *C. A. Bruce*,
Commanding Gun Boats.

No. 7. (No. 41.)—From Captain *F. Jenkins*, Agent to Governor-general N. E. Frontier, to *W. H. Macnaghten*, Esq., Secretary to the Government of India, Fort William, dated 17 June 1836.

Sir,

I HAVE the honour to acknowledge the receipt of your letter, No. 42, of the 23d ult., with its enclosure, and to submit my opinions on the several measures proposed by the Tea Committee.

2. By my letters to Dr. Wallich, No. 157 and No. 187, of the 5th ult., and 1st June[*], the Government will have been informed that the tea forests in the Muttuck and Gabhroo hills have been placed at the disposal of Government without incurring any expense; and I have further the pleasure to acquaint the Government, that one of the Singfo chiefs has consented to do whatever may be required to the forests in his district, provided Government pay the coolies employed by him. There will therefore be no expense, except in the mere hire of coolies for the fencing and clearing of the forests.

3. I apprehend that little or nothing further will be required than what is above stated, as far as regards the natural plantations[†], and the doing as much and attending to and carrying on the nurseries already planted, appears to me all that should be done until the Chinese planters have inspected the different patches of tea plants, and shown specimens of their produce.

4. On this being done[‡], I should recommend that one or two plantations, wherever the Chinese may prefer, should be placed under their particular management, and be treated exactly as they may direct. It is obvious, it appears to me, that no tea prepared from the plants now in a state of nature, can give any satisfactory result as to the produce which Assam may be made to yield when the plant is brought under proper cultivation. Conceiving that the tea which the Chinese settlers may immediately be able to manufacture, will give but a faint idea of what may be expected from the cultivated plants, it seems to me essential, to complete the experiment, that the plants should be allowed the test of a certain degree of melioration by cultivation.

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[*] 1. To obtain by purchase, or otherwise, tracts of forests in the Singfo, Muttock and Gabhroo hills.

[†] 2. That the tracts be placed under a systematic course of management for establishing tea plantations.

[‡] 3. That the tracts be protected by a strong fence from encroachments and depredation of man and beast.

4. That labourers be entertainedto dig and level the ground, and drain lands, at places where there is fear of severe flooding.

5. The Chinese may be able to judge, with some degree of accuracy, what may be produced from the tea made of the plant in its natural state; but their judgment will be relative to some particular tea with which only they are well acquainted, and would not be decisive as to this plant of Assam not being capable of yielding a different variety of tea of good quality. Before any fine teas are produced, it will be requisite possibly to extend the experiments over a great variety of grounds that are not now available, and to carry on the careful culture of particular plants for several years; but I only allude at present to such cultivation as may be necessary to satisfy private speculators of the feasibility of producing marketable teas. If we omit the tests of cultivation altogether, I should be apprehensive that we might fail to show the capabilities of Assam in regard to tea, though the failure may not be owing to the want of natural fitness of the soil and climate, but to the defectiveness of our experiments. It would thus be possible to lose all the high advantages to be expected from possessing tea plantations in British India, merely from the inadequateness of the measures pursued on the present occasion.

6. Even should the issue of the experiment now in question not be productive of results of the great national importance which are hoped for, yet as the tea is now in great demand with the Singfos and Khamtis, whilst it is only prepared in the very rudest manner possible from trees luxuriating in the wildest state of nature, it appears to me that we are almost certain of realizing very essential benefits to Assam by producing an article of consumption that will be much sought after by the Bhootians, Thibetians, and others now in the constant habit of using tea as a necessary of life. We may, moreover, be able to introduce this wholesome beverage throughout India, where tea is now universally grateful, but cannot be indulged in, except by a very few indeed, from the expensiveness of the article brought from China. A very moderate outlay may suffice to give our poor but immense population in India the means of adding to the very few luxuries they now enjoy, one of the most innocent, pleasant, and salutary known, and thus create an internal trade, the extent of which it is impossible to foresee.

7. From the information given by the Singfos, I am led to believe that the tea of Hookoom is unpalatable to them from its bitterness, and that our tea has not this defect; from a note of Dr. Lumqua's, it also appeared to be his opinion that our Assam tea was precisely of the same kind as a very highly-valued kind of Yunnan. There is every ground for presumption, therefore, I think, that our tea is by no means an inferior variety of the black teas; and that however strange its flavour may be at first to Europeans, that they will be shortly reconciled to it, and that it will be now very acceptable to all classes of natives of India, who have not been accustomed to the high-flavoured teas of our markets. It is undoubtedly a wholesome tea; and this alone will be one recommendation of it, and its cheapness, it is to be hoped, will be another.

8. On these grounds, I should by no means think it impolitic to stint the experiment now making to the mere manufacture from the forests, for it seems absolutely necessary to ascertain something of the quality of the tea that may be expected from properly-cultivated plants, both native and imported; these experiments need not be conducted on any very extensive scale, nor carried on for any great length of time, but they should be in some measure varied as to the localities, for the advantage of trying different aspects and soils; and whilst making these trials, I would not advise the plantations being made of very limited dimensions; for, as the heaviest parts of the expense will be confined to the charges for superintendence and the Chinese planters, if, as we hope, the experiment will to some extent succeed, it, in that event, will be a waste of time and a loss of money to have been expending these establishments on plantations so inconsiderable that they will not be available for further proceedings, and not remunerate for past outlays. The ground costing nothing, at the only additional charge for coolies, the Government may now establish plantations that may be so valuable as to cover the whole expense of the experiment, and if it fail, the hire of the labourers will be a small portion of the sacrifice made on it.

9. The Chinese planters and Mr. Bruce should, I think, visit together, as early as possible, all the tea tracts, and have samples made of the produce of

the leaves of each; and if these first experiments are not altogether discouraging, their immediate attention should then be turned to cultivating tea plantations on the spots, and in the manner preferred by the Chinese. In the meantime, presuming that the experiment *will not be altogether a failure,* I should recommend that all the forests should be attended to, and the nurseries be extended as far as the seeds procurable will go; for any neglect on this point may greatly retard future progress.

10. With these views as to what should be the nature and extent of our proceedings, the scale of establishment that I have already recommended in my letter of the 5th May, before alluded to, does not appear to me too large. The country is deficient in all facilities of moving; the people are very rude; and the tea tracts are located widely apart. The preservation of all the forests at present seems a most necessary precaution, for the loss of the leaves and seeds of any one of these natural forests may eventually prove very injurious. Mr. Bruce must therefore be provided with the means of moving with facility, and have assistants that he can confide in; his operations will embrace an extensive field, though the present expense, by good superintendence, may be very limited.

I have, &c.
(signed) *F. Jenkins,*
Agent to the Governor-general.

Office of Governor-general's Agent,
North-East Frontier, 17 June 1836.

No. 8.

(No. 55.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee, dated 11 July 1836.

Gentlemen,

In continuation of my letter, No. 45, dated the 23d May last, to your address, I am desired to forward for your information the accompanying copy of a communication to my address from Captain Jenkins, dated the 17th ultimo.

2. The Governor-general in Council is still of opinion that the establishment proposed in Captain Jenkins' letter, of the 5th of May last, is unnecessarily large, and that one assistant would have been sufficient for Mr. Bruce; but being unwilling to risk the success of the experiment now going on, his Lordship in Council has been pleased to authorize an establishment to be entertained for the tea plantations, consisting of one superintendent at 400 rupees per mensem, one assistant at 100 rupees, and one assistant at 70 rupees per mensem. His Lordship in Council is further pleased to authorize the purchase of two elephants, at a cost not exceeding 300 rupees; the expense of keeping these animals, and any other minor charges for labourers, chowkedars, &c. may be entered in a contingent bill.

3. Mr. Bruce, whom it is intended to appoint to the office of superintendent, may draw the allowance of that situation from the time of Dr. Wallich's arrival at Suddeya, deducting the amount he has in the meantime received as overseer of tea nurseries.

4. Your Committee will be pleased to communicate the above resolution to Captain Jenkins, and to supply him with any subsidiary instructions which may be deemed necessary to give effect to the operations on the scale which that officer has recommended in his letter, a copy of which is sent herewith.

5. I am desired to take this opportunity of acknowledging the receipt of your secretary's letter, dated the 27th of May last, and to acquaint you, that in compliance with the recommendation of your Committee, the civil auditor will receive instructions to pass the abstract of establishment and accounts of contingent charges incurred by Dr. Falconer, which accompanied your secretary's letter, and which are herewith returned.

I have, &c.
(signed) *W. H. Macnaghten,*
Secretary to the Government of India.

Council Chamber,
11 July 1836.

Ordered, That the necessary communication on the subject be made to the civil auditor.

EXTRACT INDIA REVENUE CONSULTATIONS, 11 July 1836.

From *H. Falconer*, Esq., M. D., Superintendent Botanical Garden, Seharunpore, on duty in the Hills, under orders of Tea Committee, to the Secretary to the Tea Committee of Tea Culture, Calcutta; 2 May 1836.

Sir,

I HAVE the honour to forward annexed bills: 1st. Of the expenses incurred in preparing the Government experimental tea nurseries, in the hill provinces of Gurwahl and Sirmoor. 2d. Of the contingent charges upon the transport of tea plants from Gurmooktesur Ghat to the hills. 3d. Of the wages of the establishments kept up at the nurseries of Chejooree, Koth, and Rama Serai, in Gurwahl, and of Ruroo and Bencher Baugh, in Sirmoor, since their commencement: being as follow:

1. Bill for contingent expenses on the nursery at Cheejooree - Gurwahl.
2. Ditto - - - - - - ditto - - - - - - Koth - - - ditto.
3. Ditto - - - - - - ditto - - - - - - Rama Serai - ditto.
4. Ditto - - - - - - ditto - - - - - - Ruroo - - - Sirmoor.
5. Ditto - - - - - - ditto - - - - - - Bencher Baugh, ditto.
6. Ditto - charges for transport from Gurmucktesir.
7. Ditto - wages of establishment, from 24th December 1834 to 1st January 1836.
8-9. Ditto - for the months of January, February, and March, 1836, and April 1836.

2. With regard to the contingent bills, I beg to explain, that the labour of the coolies and carpenters refers to the preparation of the ground, and the inclosing of the nurseries with a paling: the rate varying, in some particulars, in the different districts, and the amount differing according to the facilities of the localities respectively. The item for compensation for produce on the nursery ground is greater in the Ruroo nursery than in the others, from a portion of the crop having been opium.

3. With reference to the bills for establishment, amounting to 50 rupees per month, I have to remark, that the gardeners have been continuously held on in all the nurseries from the first operation, so as to protect the ground, and be efficient for any supply of seeds or plants that might be received; and that the chuprassees were only attached to three of the nurseries, viz. Chejooree, Koth, and Rama Serai, in which alone tea seeds were sown, and where the sowing operations were begun. The establishment will now be increased by two chuprassees, one at Ruroo, and one at Bencher Baugh, in Sirmoor, tea plants having been distributed to all the five nurseries.

4. With regard to the rate of wages, the gardeners have been fixed at seven rupees each per month, being one rupee more than is allowed to the gardeners upon the Seharunpore botanic-garden establishment, while employed in the hills; this addition having been made as an inducement to secure men of good character from the plains, to remain for a length of time in the hills. The chuprassees have been fixed at five rupees each per month.

5. All the arrangements hitherto have been framed on a scale of economy proportioned to the absolute wants of the establishments. As tea plants have now been distributed to all the nurseries, I beg to suggest to the consideration of the Committee, that the establishment be put on the following footing:

A Persian writer, at 15*s.* per month.
Two unattached chuprassees, at 5*s.* each per month.
Five gardeners - - - - at 7*s.* ditto - ditto.
Five attached chuprassees - at 5*s.* ditto - ditto.

The writer to keep the accounts and records of the progress of the nurseries; the two unattached chuprassees to establish constant attendance of one responsible person upon the ground.

6. I have to request the favour of your putting the bills in train of being passed and made payable, to meet the advances for the expenditure, and to

furnish me with a document authorizing the establishment in future upon such a footing as the Committee may be pleased to approve of, to enable me to send in monthly bills for the salaries.

7. I further enclose a descriptive roll of the nurseries, and an abstract of the present establishment; a detailed report, with all other particulars, accompanied under a separate cover.

I have, &c.

(signed) *H. Falconer*, M. D.,
Sup^{dt} Bot^{l} Garden, Seharunpore, on duty in the Hills, under orders of Tea Committee.

Hills, North of Deyrah,
2 May 1836.

DESCRIPTIVE ROLL of the GOVERNMENT EXPERIMENTAL TEA NURSERIES, in the Hill Provinces of *Gurwahl* and *Sirmoor*.

NAMES of NURSERIES.	Provinces.	Extent.	Geographical Position. Long.	Geographical Position. Lat.	Elevation.	Exposure.	Distribution of Plants.	REMARKS.
Chejooree - - -	Gurwahl	about 2 beegahs	78° 4	30° 29	About 4,000 ft.	Northerly -	300	- - 25 plants tried at an extra locality; elevation 6,400 feet.
Koth - - -	ditto	about 2 ditto -	78° 7	30° 36	5,300 ft.	South-west	300	
Rama Serai - -	ditto	about 2 ditto -	78° 2	30° 52	5,000 ft.	- ditto	300	
Ruroo - - -	Sirmoor	about 1½ ditto -	77° 49	30° 56	5,400 ft.	E. S. E.	300	
Bencher Baugh - -	ditto	about 1½ ditto -	77° 21	30° 39	5,100 ft.	Southerly -	100	

(signed) *H. Falconer*, M. D.,
Superintendent Botanical Garden, Seharunpore, on duty in Hills, under orders of Tea Committee.

Hills, North of Deyrah,
28 April 1836.

ABSTRACT of the ESTABLISHMENTS attached to the GOVERNMENT EXPERIMENTAL TEA NURSERIES, in *Gurwahl* and *Sirmoor*; commencing with 24th December 1834.

NAMES of the NURSERIES.	Name of Hill Province.	GARDENERS. Number.	GARDENERS. Rate of Wages per Month.	GARDENERS. Date of Service.	CHUPRASSEES. Number.	CHUPRASSEES. Rate of Wages per Month.	CHUPRASSEES. Date of Service.
Chejooree - - -	Gurwahl -	1	7 rupees	24 Dec. 1834		5 rupees -	7 March 1835.
Koth - - - -	ditto -	1	7 rupees	- ditto -		5 rupees -	- ditto.
Rama Serai - - -	ditto -	1	7 rupees	ditto		5 rupees -	- ditto.
Ruroo - - - -	Sirmoor -	1	7 rupees	- ditto			
Bencher Baugh - -	ditto -	1	7 rupees	- ditto			

(signed) *H. Falconer*, M. D.,
Superintendent Botanical Garden, Seharunpore, on duty in the Hills, under orders of the Tea Committee.

Hills, North of Deyra,
28 April 1836.

EXTRACT INDIA REVENUE CONSULTATIONS, 15 August 1836.

No. 7.

From the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Governor-general; 6 August 1836.

Sir,

WE have the honour to request that you will submit to the consideration of the Right honourable the Governor-general in Council the following facts and observations derived from a private communication from Mr. Bruce, of Sudya, which we have been afforded an opportunity of perusing, and which appears to us to convey information of very great interest and importance.

Vide accompanying sketch Map, No. 1, drawn by Mr. Bruce.

2. It appears that Mr. Bruce, unappalled by the discomforts, difficulties, and even dangers of travelling in the rainy season through the jungly country of Singfos, on the south side of the Burhampooter, made an excursion amongst those tribes as far as Beeralakum, on the Terappanee, beyond the Burra Dehing river, from which he returned in the beginning of July.

3. Confiding in his own extraordinary talent for conciliating the goodwill of these rude people, he took with him only one servant, and two other attendants. Before reaching Koojee, on the Debru river, where tea had been found by Dr. Wallich, Mr. Bruce heard that there were other spots producing tea near that place, and on his arrival there, he sent for the gaum, and questioned him on the subject. At first the gaum denied that any more tea grew in that neighbourhood than he had shown when Mr. Bruce was there with the deputation. By presenting him with a little opium, and the use of a "few soft words," however, Mr. Bruce prevailed upon him to promise that he would make further inquiries. Next morning he told Mr. Bruce that he had got information of a large patch not far from his house, and people having been immediately set to work to clear it, Mr. Bruce proceeded to Ningrew, on the Burra Dehing river. There the gaum, though very kind and civil, denied at first that he knew of any more tea in that neighbourhood than had been already shown to the deputation; Mr. Bruce made him a small present of opium, and told him how much he would be thought of by the Commissioner if he forwarded his views, seated himself cross-legged amongst his people, smoked a Singfo pipe, addressed the chief as "elder brother," and conducted himself altogether so as to completely ingratiate himself with him. The chief took up Mr. Bruce's double-barrelled gun, and begged him to ask the Commissioner to grant him one, as he had already made similar presents to the Tow and Bunwah gohains. Mr. Bruce said presents had been made to those chiefs on account of services they had rendered Government, and if the gaum would do the same, he would apply in his behalf to the Commissioner. By this means Mr. Bruce obtained information that tea was growing at Jugundoo, further down the Burra Dehing. To this place he proceeded forthwith in a canoe manned by Singfos, and on his arrival, persuaded the gaum to set about clearing the tea trees from the low jungle and creepers amongst which they were buried; some of the produce of those trees was prepared and compared with some Chinese tea brought by Mr. Bruce, which the gaum declared was not equal to his own. A payment of 20 rupees, with the promise of a further payment of 20 rupees as soon as the ground should be cleared, sufficed for the expense of that operation. Returning to Ningrew, Mr. Bruce found that considerable progress had been already made in clearing the jungle from the tea trees at that spot, and a similar payment, and further promises were made there, as at Jagundoo. A little more opium, and "sweet words," induced that chief to make a further disclosure of the existence of tea trees at a place called Phakial, and distinguished by Mr. Bruce from another village of the same name, as Big Phakial. Here Mr. Bruce was not able to find the spot described, but the Ningrew chief promised to take him to it at his next visit. He likewise got information of two large patches of tea trees at a place called Sookumcumjoy, one at Kanang, one at Namchik, and, besides the two spots already known, a third at Kooju, in all 10, and none of them further than one day's journey from Ningrew. The tea behind Big Phakial is said to grow on a small range of hills rising there, from 60 to 100 cubits, but attaining a more considerable height as they extend to the neighbourhood of Jypoor. Close to Phakial is a small stream rising on those hills called Powipanee, where gold is collected in great abundance, as it would seem, for Mr. Bruce was informed that three men are able to obtain a sicca weight per diem. The course of the river does not exceed 12 miles in length, and Mr. Bruce suggests that if traced towards its source some rich bed of gold might be discovered. The Ningrew chief, who is a Hookum man, says, the tea tree that grows on the hills there reaches not more than 10 or 12 feet in height, and bears leaves, of which none exceed an inch and a half in length; while the tea trees that grow on the plain are similar to those of Ningrew. Besides those two sorts, he added, that there is a third species, which is bitter,

and which the Singfos do not use. It never grows in the same place with the other tea. It is distinguished by the central thick fibre of the leaf, as well as the edges being of a brownish colour. The small-leafed tea of the hills is also described as more deeply serrated than that of the plains; so that as far as this information can be relied on, there can be no doubt of the existence of three indigenous species of tea in Upper Assam. With respect to the existence of a bitter species, the information communicated to Mr. Bruce confirms that obtained from a Burman chief by Major White, and already communicated by Captain Jenkins to Government. On mentioning at Ningrew the process used at a place called Palang for preparing the tea-leaf, by subjecting it to a species of fermentation, the people declared themselves well acquainted with that mode, and that it produced excellent tea, which, however, was used only to eat with rice. In this way, however, they affirmed that it produced the same effects as its decoction, in preventing sleep, insomuch that if one ate much of it he could never sleep again!

4. That the indigenous tea of the Singfos should possess the quality here attributed to it to such a degree as to be remarked by those hardy people, the Committee consider to be a fact of the greatest importance, as in one most striking respect identifying the species alluded to with the green tea of China. Mr. Bruce describes the whole of the country which he traversed as a plain, intersected by numerous nearly parallel ravines, which at this season form watercourses. This is very different from the description of country in which the black tea is found in China, while it corresponds with that in which green tea is principally cultivated. A similar correspondence to a certain extent is found in the nature of the soil, which is far more favourable to other vegetation than that of the black tea hills of China, and in this respect approaches those superior soils in which green tea is there cultivated. These considerations appear to us to warrant the conclusion anticipated by Mr. Bruce, that the tea which grows on the plains of Upper Assam is of the green species.

5. We think it also highly probable that the small deeply-serrated leafed tree of the hills will prove to be of the black species; and the third, or bitter kind, to be identical with that which is brought from the western provinces of China to Canton, and there used medicinally.

6. Had we anticipated this discovery while our secretary was in China, we should, of course, have directed him to engage the services of persons practically acquainted with the peculiar process by which the green tea-leaf is prepared for the foreign market. That which is followed at Canton, in the preparation of the green tea cultivated in some parts of that province, corresponds exactly with the description given by the Chinese deputed by Mr. Gordon to the green-tea country, of the method followed in that district, and which differs materially from the more simple process followed in the manufacture of black tea. We beg, therefore, to recommend, that we be permitted to take steps for procuring a few manufacturers of green tea from Canton, with such workmen as are employed exclusively in making the requisite implements. If no delay be incurred, it will be practicable to bring those people round in time to commence operations at the ensuing proper season of March or April; and should their success realize our present sanguine expectations, the important object of Government, which led to our appointment, will have been, in one considerable respect, attained, and individuals may be confidently invited to engage in a branch of commerce fraught with the most valuable results in relation to the civilization and prosperity of Assam, the revenues of India, and the commercial relations of Great Britain.

7. It cannot, however, escape the notice of Government, how intimately connected with the full realization of the advantages so near our grasp, is the establishment of friendly feelings in the minds of the rude tribes, amongst whose villages the indigenous tea is found, towards the British name generally. How successful Mr. Bruce has been in effecting this very important object, is instanced in the foregoing statement, and has been officially testified on former occasions. We do not call for any specific mark of the approbation of Government to the zeal, enterprise, and judgment now displayed by that gentleman, highly as we estimate them, but conclude by requesting that means may be placed in his hands to confirm and extend his influence, by granting him a few

cheap double-barrelled guns and pistols, to be presented, at his discretion, to such native chiefs as may have it in their power, and may show inclinations favourable to our objects. The cost of the whole need not exceed 500 or 600 rupees.

We have, &c.

(signed) *J. Pattle.* *Ross. D. Mangles.*
N. Wallich. *Ram Comul Sen.*
6 August 1836. *C. E. Trevelyan.* *J. W. Grant.*

(No. 65.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee; 15 August 1836. No. 8.

Gentlemen,

1. I AM directed to acknowledge the receipt of your letter, dated the 6th instant, the contents of which are very satisfactory.

2. In the 6th paragraph of that communication, you recommend that permission may be granted to procure a few manufacturers of green tea from Canton, with such workmen as are employed exclusively in making the requisite implements; but it does not appear that Mr. Bruce has anywhere urged the necessity of this measure. I am directed, therefore, to request that you will communicate further with Mr. Bruce on this point, and ascertain from him whether the people referred to are urgently required at the present stage of his proceedings. Should such prove to be the case, you will be pleased to submit an estimate of the expense which would be incurred in giving effect to the measure.

3. His Lordship in Council has been pleased to sanction the outlay of a sum, not exceeding 500 rupees, for the purchase of cheap fire-arms, to be presented, at the discretion of Mr. Bruce, to such of the native chiefs as may have it in their power, and may show inclination favourable to promote the object in view.

I have, &c.

(signed) *W. H. Macnaghten,*
Secretary to the Government of India.

Council Chamber, 15 August 1836.

Ordered, That the necessary communication be made to the civil auditor and sub-treasurer respectively.

EXTRACT INDIA REVENUE CONSULTATIONS, 12 September 1836.

From the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Government; dated the — August 1836. No. 9.

Sir,

WE have the honour to acknowledge the receipt of your letter of the 15th inst., with reference to the second paragraph of which we beg to state as follows:

Our reasons for recommending that early measures should be taken for procuring manufacturers of green tea, and of tea-chests, from Canton, were stated to be the conclusion we had ourselves arrived at, that the indigenous tea of the Singfo country was of the green-tea species; and, secondly, that the Chinese of the Bohea country, now in Assam, are quite ignorant of the proper process for manufacturing that species of tea. Mr. Bruce is neither aware of some of the grounds on which we have arrived at the same conclusion with himself regarding the species of the plant, nor has he any suspicion that the Chinese now in Assam are not equally familiar with both species. The circumstance that seems principally to have weighed with Mr. Bruce, in his conjecture regarding the species of the Singfo plant, appears to have been the quality of preventing sleep attributed to it. We had, however, been predisposed to arrive at the same conclusion, from the consideration that, in point of locality and of soil, the circumstances of the Singfo plant coincide with those in which the green-tea plant is produced, and not with those in which the black-tea plant is found, in China; at the same time, that a different species from that seen in the plains, and corresponding in description with the black species, is averred to grow in the neighbouring hills. Mr. Bruce, therefore, being ignorant of the facts on which the expediency of the measure rested, could not have suggested it, nor would he now be able to form any idea of its necessity, except what he might draw from the information we should ourselves afford him. He does, however, express great anxiety for the arrival of the Chinese, now detained by sickness at Biswanath, under the mistaken idea of their competency to manufacture green tea. We shall, however, in obedience to the orders of Government, address Mr. Bruce on the subject.

With respect to the probable expense of procuring the people referred to, we can only estimate widely, that, supposing six people required, they may be procurable at an aggregate of salaries somewhere between 300 and 600 rupees per mensem, according to the degree of danger they would be exposed to in entering on a contract with foreigners; and this depends upon the accidental vigilance or laxity of the Chinese authorities. They may probably stipulate for an advance of three months' wages before embarking, and perhaps 200 rupees for tools and instruments. To this add passage money, say for six men, at 50 rupees, making 300 rupees, and the utmost outlay in the first instance will be:

For advance of wages for three months -	900	Spanish dollars.
Tools - - - - - - - - -	100	—
Passage money - - - - - -	150	—
Sp. dollars - -	1,150	

Or, possibly, the object may be effected for 700 dollars.

We have only to repeat our conviction, that the incurring of this expense, be it greater or less, is indispensable to the further pursuit of the experiment intrusted to our superintendence; and that, under the persuasion that the speediest mode of bringing to the test the real value of the indigenous tea of Assam is manifestly the most economical, it is our recommendation, that another year's expenditure should not be thrown away while discussing to what extent a portion of it shall be incurred. Unless the persons whom we have proposed to procure from China can be set to work in the Singfo country by the month of March next, their services will be unavailable for a whole season.

We have, &c.

(signed) *J. Pattle.* *Ram Comul Sen.*
Ross D. Mangles. *N. Wallich.*
C. K. Robison. *C. E. Trevelyan.*
J. W. Grant. *Radhakant Dev.*

The — August 1836.

No. 10. (No. 74.)—From *W. H. Macnaghten*, Esq., Secretary to Government of India, to the Tea Committee, dated 12 September 1836.

Gentlemen,

I AM directed to acknowledge the receipt of your letter, without date, received on the 29th ultimo, explaining your reasons for recommending the adoption of early measures to procure the manufacturers of green tea from China; and in reply to inform you, that the Right honourable the Governor-general in Council will suspend the issue of final orders on this subject till the receipt of Mr. Bruce's reply to your communication.

I have, &c.

(signed) *W. H. Macnaghten*,
Secretary to the Government of India.

Council Chamber, 12 September 1836.

EXTRACT INDIA REVENUE CONSULTATIONS, 19 September 1836.

(No. 1086.)—From *H. Chamier*, Esq., Chief Secretary to the Government of Fort St. George, to *W. H. Macnaghten*, Esq., Secretary to the Government of India; 22 August 1836. No. 1.

Sir,

1. THE Governor in Council having, in accordance with the wishes of the Government of India, as conveyed in paragraph 2 of your letter of the 30th March 1835, called on the officers to whom the experimental cultivation of the tea plant had been entrusted to furnish a report on the growth, appearance, and present condition of the seedling plants, of which 20 boxes were received from Bengal, and distributed in the proportions noted below.* I am directed to transmit to you, for the purpose of being laid before his Lordship in Council, copies of their replies†, from which it will be observed, that the experiment has almost entirely failed, and that with the exception of a few plants on the Neilgherry hills, and in the Nuggur country, the rest have withered away.

2. Should his Lordship in Council, after a perusal of these reports, resolve to make a further trial in the cultivation of the plant on this side of India, the Governor in Council would desire to draw his Lordship's attention to the suggestion contained in the concluding paragraph of the letter dated the 13th instant, from the Commissioner for the affairs of Mysore, as to the proper season at which the plants are required to be there.

(signed) *H. Chamier*,
Chief Secretary.

Fort St. George, 22 August 1836.

From Lieutenant-Colonel *T. King*, Commanding Neilgherries, to the Chief Secretary to Government, Fort St. George; 9 July 1836. No. 2, Enclosure.

Sir,

IN reply to your letter of the 2d instant, I have the honour to state, for the information of the Right honourable the Governor in Council, that out of the six boxes of tea plants which were sent up to Cotacamund in December last, there are not more than 20 of the plants now alive; and whether they will ever arrive at perfection seems very doubtful.

Six of them have recently been sent to the charge of a gardener at Billieul, named James, by order of the Governor. Ten were transplanted into the garden at Kaisee, eight of which still bear a healthy appearance; and 10 more have been distributed among the permanent residents here, who cultivate gardens.

I shall take the opportunity of marking the progress of these plants, and do myself the honour of reporting to you thereon.

I am apprehensive that they were kept too long in the boxes, in which numbers had perished before they reached Cotacamund, and that the remainder were not properly attended to afterwards.

From my observation of three forward plants, which have been in the garden to the house I at present occupy for a considerable period, the growth of them appears to be very slow, and I doubt if they will ever attain the proper size, although they are apparently in a very healthy state, and continue to throw out new shoots.

(signed) *Thomas King*,
Lieut.-Colonel, Commanding Neilgherries.

Cotacamund,
9 July 1836.

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* 6 boxes to the officer commanding the Neilgherries.
6 boxes to the Commissioner for Coorg.
6 boxes to the Commissioner for Mysore.
2 boxes to the Agricultural and Horticultural Society at Madras.
20

† From the officer commanding the Neilgherry hills, dated 9th July 1836. From the Secretary to the Madras Agricultural and Horticultural Society, dated ——, received 8 August 1836. From the Commissioner for the affairs of Mysore, dated 13th August 1836, with Two Enclosures.

From *W. Liddell*, Esq., Secretary to the Madras Agricultural and Horticultural Society, to *H. Chamier*, Esq., Chief Secretary to Government, &c. &c. &c.; — August 1836.

Sir,

I HAVE the honour to state, in reply to your letter of the 2d ultimo, respecting the two boxes of tea plants which were sent to the committee of the Madras Agricultural and Horticultural Society in December last, that the society had not at that time any garden of their own, and that the plants in question were taken charge of by a member of the committee, who kept some in his own garden, and distributed the remainder amongst other members of the society; but, notwithstanding the utmost attention on the part of those entrusted with them, they all died.

It appears to be the general opinion of the committee, that the season of the year in which the tea plants reached Madras was very unfavourable to them, but, it is right to add, that the plants were all dead before the hot winds set in.

(signed) *William Liddell*,
Secretary to the Madras Agricultural and Horticultural Society.

Madras, — August 1836.

(No. 71.)—From *M. Cubbon*, Esq., Commissioner, to the Chief Secretary to Government, Fort St. George; 13 August 1836.

Sir,

WITH reference to the last paragraph of my letter of the 26th ultimo, I have the honour to transmit, for the information of the Governor in Council, copies of letters from the superintendents of Coorg and Nuggur, under date the 12th and 26th ultimo, reporting, I regret to say, the almost entire failure of the experiments made to introduce the tea plant into Mysore and Coorg.

2. It is proper to state, that these plants arrived above the Ghauts in the end of December, a most unfavourable season for vegetation, in consequence of the strong parching winds which prevail at that period; and that, if it should be deemed advisable to make a further trial, I would respectfully recommend, that the plants should be sent so as to arrive in Mysore between the months of May and October, which is considered to be the best time for putting tender plants into the ground.

(signed) *M. Cubbon*,
Commissioner.

Mysore Commissioner's Office,
Bangalore, 13 August 1836.

From *C. F. Lettardy*, Esq., Superintendent, to the Commissioner for the Affairs of Mysore, Bangalore: 12 July 1836.

Sir,

IN reply to your letter of the 9th instant, forwarding copy of a communication from the chief secretary of the Madras Government, dated the 2d instant, requesting information relative to the growth of the tea plants received from Bengal, I have the honour to state, that out of 541 plants contained in the boxes, only 132 were found alive on their arrival at Mereara.

2. On the receipt of Captain Clarke's letter of the 26th February last, between 80 and 90 then remaining alive were removed from the boxes, and planted in the garden of the new palace at Mereara, in soil considered favourable to their growth; but, although every possible care was taken of them, their number continued gradually decreasing until there remained, at the end of May, not more than half a dozen alive, as reported in my letter of the 31st of that month. The few that then survived have also, I regret to say, withered away.

It may be proper to mention, that on the plants being removed from the boxes, a number of small white grubs were found about the roots of all the dead ones; and as the same kind of grub was also observed about the roots of several of those that died after being transplanted, it is probable that their failure may be owing to the injury which they received from this insect, rather than to the climate or to the soil into which they were transplanted.

Superintendent's Office, Coorg, (signed) *C. F. Lettardy*,
Mercara, 12 July 1836. Superintendent.

(No. 347.)—From *H. Stokes*, Esq., Superintendent, to the Officiating Secretary to the Commissioner for the Government of the Territories of the Rajah of Mysore; 26 July 1836.

Sir,

I HAVE the honour to acknowledge the receipt of your letter, No. 198, of the 9th instant, calling for information to be furnished to the Madras Government regarding the growth and present condition of the tea plants forwarded to this division in January last.

2. In my letter of the 29th January, I reported that on the arrival of the six boxes at Terry Kerry only 104 of the plants showed any appearance of vegetation, and that in the three boxes which were brought to Shewmoga, 35 only had any leaves when they reached this place. Being in daily hopes of receiving the instructions regarding the proper mode of treatment promised by the Tea Committee, and being apprehensive of exposing the plants in their then sickly condition to the hot, dry weather which then prevailed, I deferred their transplantation, and allowed them to remain in the boxes, which were moderately watered, and watched with all the attention that could be bestowed upon them. None of the plants, however, that had shed their leaves again recovered, and the others continued to languish and gradually die off, till on my return to Shewmoga in the end of March, I found only about 10 remaining alive. I then thought it best to have them transplanted at all risks; only three took root, and one of these was subsequently nipped off close to the ground by some insect. Two still survive, but though they continue to throw out leaves, they are yet very diminutive, only about three inches high.

3. With respect to the three boxes which were sent to Chiccamoogaloor, I enclose copies of the arzees received from the amildar, from which it appears, I regret to observe, that no better success has attended them than those which were brought to Shewmoga.

Nuggur Division, (signed) *H. Stokes*,
Superintendent's Office, Shewmoga, Superintendent.
26 July 1836.

Ordered, That copies of the foregoing papers be forwarded to the Tea Committee for their information.

From Captain *F. Jenkins*, Governor-general's Agent, to *G. J. Gordon*, Esq., Secretary to the Tea Committee, Fort William; 18 October 1836.

Sir,

I HAVE much pleasure in forwarding a letter, in original, from Mr. C. A. Bruce, superintendent of tea plantations, detailing the result of a recent visit to the Muttuck country, in the discovery of tea plants in several new localities, in reconciling the Bur Senaputtee, who had evinced a good deal of jealousy in regard to our occupation of the tea forests, to the proceedings of Government, and inducing him to take upon himself the charge of the preservation of all the tea in his district.

2. The measures pursued by Mr. Bruce towards this chieftain will, I trust, be approved by the Committee; and I hope it will not be long before Mr. Bruce will be able to report an equal success in his negociations with the Singpho chiefs, in persuading them also to feel that it is their interest to promote the views of Government.

3. The Committee will observe, that one of the principal objects of Mr. Bruce's present trip was to examine the state of the tea plants on a patch of

land where they had been cut down, and deprived of the shade of the large forest trees, by the villagers, in preparing the ground for a rice crop, but had again sprung up, and were full of tender foliage, notwithstanding their complete exposure to the sun. Mr. Bruce considers the result of this unintentional experiment to be conclusive as to the propriety of adopting a similar process in regard to all the other tea tracts; but before having recourse to this decisive measure, he would wish to be favoured with the sentiments of the Tea Committee. I should suppose that the Chinese cultivators, whose arrival at Suddya is reported in the postscript of his letter, would be able to give him information that he could depend upon in regard to the proper treatment of the plant.

4. Mr. Bruce, in a concluding paragraph of his letter, suggests the expediency of abandoning the plantation at Suddya, and distributing the plants amongst the native chiefs. This recommendation seems to me worthy of adoption, for we are now certain, I think, from the great quantities of tea plant lately brought to light, of securing a sufficiency of the indigenous plants, without having recourse to any artificial plantations of these plants whatever, at least at the expense of Government, for it appears certain that if the Chinese manufacturers succeed in making a tea that will be in demand for exportation, the native chiefs will take care to propagate the plants to any required extent, on being remunerated for the leaves supplied.

5. Mr. Bruce reports his having engaged Mr. R. Bruce as his assistant from the 1st August, under the permission granted in Mr. Secretary Macnaghten's letter of the 11th July last, and requests his pay may be sanctioned from the former date.

6. I beg to call the favourable attention of the Committee to the last paragraph of Mr. Bruce's letter.

7. Having been unable to get Mr. Bruce's letter copied, I have to request the favour of the Committee returning it, with their reply.

Political Agent's Office,
N. E. Frontier, 18 October 1836.

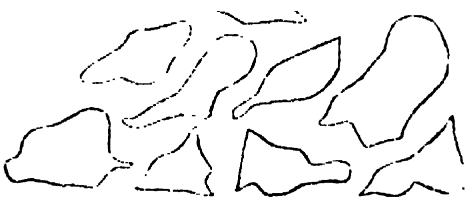
(signed) *F. Jenkins*,
Governor-general's Agent.

From *C. A. Bruce*, Esq., Superintendent of Tea, to Captain *F. Jenkins*, Agent to Governor-general, Gowhatty; 1 October 1836.

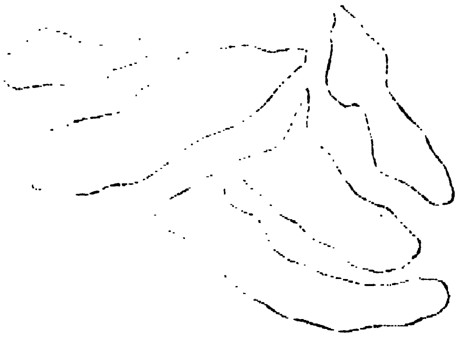
Sir,

I HAVE the honour to inform you of my return from a trip to the Muttuck country, where I went to collect tea seeds, and to examine the state of the tea that had been cut down last year by the villagers. When these people cut it down, they were not aware that it was tea, but thought it was a part of the forest. It was cut down on a level with the ground, as all the other trees of the forest were, excepting those that were rather thick, and which they cut from two to four feet of the ground. The ground was then cleared from weeds, &c. by the hoe, and with it the earth was turned up a few inches deep. This was in (Maug) January. In (Falgun) February the ahoo paddy was sown. The paddy came up, ripened, and was cut down; after which came the tea, it was just springing up when I took the deputation there in March to look at it. There were then numerous young leaves, which had rather a yellowish appearance. But when I saw it a day or two ago, it had grown from three to ten feet high, and the leaves were of a fine healthy green. The trees that are ten feet high, had been cut down about four feet from the ground by the villagers, and abundant shoots had sprung up a little below the part that had been cut; some of these trees were full of flower buds. The old stump of those that had been cut a few inches above the ground had decayed, but numerous young shoots had sprung up from below, more than those that had been cut four feet from the ground; and it appears to me, all those that had been cut on a level with the ground, threw out more shoots and leaves than those that had been allowed to remain four feet high. It must be remembered, that all these are in the open air, and exposed to the sun, excepting in the evening the high trees surrounding the jungle keep the sun off. These young plants are full of tender leaves, and the sight is very pretty, just such as one would fancy a China tea-garden to be. I am sorry to say the plants cut down are confined to a small patch of ground, but quite sufficient to show us that the experiment so long desired (to know whether these trees would grow in the sun or not) has been crowned with the greatest success. From the jungle adjoining this all the trees but the tea have been cut down; the contrast between the old and the new tea is great, the former long and thin, with large old leaves, the latter nice little bushes with fresh young leaves. Now this is another proof that they will thrive in the sun; but the experiment on the old trees has not been sufficiently long, nor in my humble opinion is it necessary. Supposing these long and lofty trees (some 29 cubits in height) were to produce numerous young leaves, how could they all be collected? My opinion is this, (and I think I have sufficient living and thriving proofs) to treat the whole of the tea tracts in the same manner as these villagers in their ignorance have done, by cutting the whole down, and clearing the ground with the hoe from weeds, &c. in the month of January and February. But before such a sweeping measure as this should be adopted, I would invite any gentleman to come up and see; perhaps some of the officers from Bishnauth might like to take a trip of pleasure and examine it, in the cold season. The village people, and all those who from their infancy have been brought up to agriculture, agree with me that this would be the best plan, and it is certainly the one I would recommend. The old trees and their branches might be planted off as new plantations. On my arrival at Rungah Gurrah I called on the Rajah Burrah Sunna Putty, and asked him to let me have an elephant and a few coolies to enable me to proceed to Tingry, to examine the tea there. He gave them to me with coolness and reluctance, and shortly afterwards told me that as he was going to bathe and take some refreshment, that I had better do the same. I immediately took the hint, and was off on my way to the tea, and at Tingry I lost no opportunity of gaining all the information I possibly could, by kindness and making a few presents, and by free access to my person of all the village people, who came flocking in to see me, so much so that I seldom retired to my humble couch of paddy-grass on the ground before midnight; however, I was richly repaid for all this by my success in being informed of one tea tract after another, although they had been strictly prohibited from giving me any information whatever. I told all these people that I had come to do their country good, by instructing them how to cultivate and manufacture tea; but I do not think any of them believed me, so strongly had they been prejudiced and assured to the contrary.

As some of the tea was said to be not far, I could not resist the temptation of visiting three or four of the nearest tracts (although this time of the season was considered to be very unhealthy). An hour's ride from Tingree, through swamps and jungle, brought me to tea. I went down the Kahung river, (which is only about 20 feet broad, and at present only about a foot of water in it,) and for a ride of about 20 minutes, saw the tea right and left, now and then, situated on little mounds or hillocks of earth, from 8 feet by 8, to 20 feet long, and six broad. Large trees had grown on these mounds, and their roots alone appeared to me to save them from being washed away: under these the tea trees were growing. To form some idea of which, it was something like this. Shortly after I came upon extensive hillocks, of good length and breadth, with water flowing all round, the same as the others, and which had been partly cleared by my people. Here the trees were in greater number and thicker, many of them with flowers full blown and numerous flower-buds, as also a number of seeds. As I had brought many of the villagers along with me, I loaded them with seeds. On my return, I was informed of two more places where the tea was growing, both north and south of one another, each side of Kanjure village, and close to the Kahung river. I immediately sent one of my men to examine one of the spots; the other he did not see. My people whom I had sent out some time ago gave me a good deal of information.



But to make all this plain, and to show the number of tea tracts already discovered by me at one view, as also of those that I have been informed of, I have *Vide* Map II. marked them all down in the accompanying Map, which I make in haste. It will, I think, be found pretty correct, and I could but put down little more than 7' in so short time. One thing, I think, is worthy of notice, that all our Assam tea grows near water, and appears to be very fond of it; for wherever there is a small stream, or jheel or jhou, tea is sure to be there. I speak of the Muttuck and Singphoo countries. Even those tracts that are not close to the river, such as those near Kujoo and Kujoodoo, are nothing but large mounds of earth situated close to each other, thus, with water flowing all round them. These mounds are just high enough to prevent their being inundated in the highest rains.



I have entered into details more particularly to enable all those who are interested in the success of our British India tea, to thoroughly understand all the peculiarities of the Assam tea-plant.

On my return from Tingree, with tea seeds for yourself and other gentlemen in Assam, to be distributed to every one that would use them, and which I did myself the honour of sending off express on the 27th ultimo, that they might reach them fresh and sound, I called upon the Rajah, and explained to him that our Government was at a deal of trouble and great expense about this tea on his account; that, as soon as we had taught them the method of rearing and making tea, we would leave it to them, and then purchase from them as much as ever they could cultivate and manufacture in our way; that as he and his country were to reap all the benefit, he ought to go to the expense of clearing and manufacturing it. As soon as he understood that it was for his own interest, and the good of his country, he entered into the spirit of the thing, and said that he would find out every place where it grew, and make every one in his country cultivate it, and that I may inform you that such was his intentions, but that I must instruct him all about it. Rely on it, in this he is perfectly sincere; the love of gain will induce him to fulfil his promise.

As soon as I had settled this point to my satisfaction, and, I trust, to that of Government, and at the same time of having forwarded our tea prospects by some years, I requested the Barrah Sunnah Putty to let me have an elephant to carry me over-land to Suddyah, as I not only wished to see the country, but whether I could find any more tea on the route to this. In this I was not successful, nor could I hear of any more tea after I had crossed the Debrah river. It appears all to lie on the south side of that river, and the Burrah Dohing, in the Muttack country. At this time of the year what I saw of the country was only thick jungles and swamps.

I would recommend giving up the Suddeeah tea plants, and distributing them among the native chiefs and others that may wish to take them, as the money now being expended on them might be employed in far better manner in clearing the Singpho forests, which would be a great saving to Government.

Some time ago Government proposed clearing Gabru Parbut, along with Rajah Purrunder Sing. If you will permit me I will call on him, and have no doubt, for his own interest, not only to clear Gabru Parbut, but also the tea at Borehaut and Jeypore, and moreover make him get all his ryots to cultivate small patches. If this could be accomplished it would be another great saving.

With respect to the Singphoes, they are a different race of people, and should be dealt with accordingly, I, however, do not despair of bringing them round also to study their own interest, and one and all to cultivate tea. If this could all be effected, we would soon have all Upper Assam a tea-garden.

I would like to go back to the Singpho country to make a few presents to those gaums who may be favourably disposed to our objects, I therefore hope the guns and pistols are on their way up, the very sight of which would make them promise anything.

I beg leave to say, that agreeably to the permission granted in a copy of letter you sent me from Mr. Secretary Macnaghten, dated 11th July, I have appointed Mr. R. Bruce my head assistant, from the 1st August, and have ordered him up to Suddeeah, and request that his pay may be allowed to commence from that date; and as he will require an elephant to traverse the country, I beg you will grant me permission to purchase one for him.

In conclusion I beg to say, that as I am exposed to all weathers, and at all seasons, in these unhealthy jungles, should I unfortunately be taken off by a jungle fever, that Government would kindly make some provision for my family, as I am an uncovenanted servant.

(signed) *C. A. Bruce*,
Suddeeah, 1 October 1836. Superintendent of Tea.

31 October.

I have the honour to report the arrival of Chinamen this day. Out of seven pots of plants they brought, four are dead, the other three look pretty healthy.

(True copy.)
(signed) *G. J. Gordon.*
Secretary to Tea Committee.

(No. 96.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee; 14 November 1836. No. 8.

Gentlemen,

I AM directed by the Right honourable the Governor-general of India in Council to acknowledge the receipt of your letter, dated the 27th ultimo, submitting Mr. Bruce's communication, concurring with you for the introduction of green-tea manufacturers and tea-chest makers from China, and stating that you will endeavour to arrange for three of the former to leave China by September or October, and for the latter to be sent round immediately: reporting further discoveries of new patches of tea, and recommending the continuance of the experiment for cultivating the tea plants in nurseries at an annual cost of 150 rupees, and that Mr. Bruce be allowed an addition to his present salary; also requesting permission to purchase sundries for the use of Mr. Bruce, and for presents.

2. In reply, I am desired to state, that his Lordship in Council is pleased, under the circumstances stated in the correspondence which accompanied your letter, to approve and sanction the suggestions which you have submitted; but previously to granting any addition to the allowances already fixed for Mr. Bruce, his Lordship in Council is desirous of ascertaining your opinion as to the nature of the augmentation which could reasonably be afforded.

(signed) *W. H. Macnaghten*,
Council Chamber, Secretary to Government of India.
14 November 1836.

Ordered, That the necessary communication be made to the civil auditor and sub-treasurer respectively.

EXTRACT INDIA REVENUE CONSULTATIONS, 23 January 1837.

From the Members of the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Government; 12 January 1837. No

Sir,

WE have the honour to state, for the information of Government, that by private letters from Mr. Bruce, dated Sudiya, 19th December, and addressed to Dr. Wallich and our secretary, it appears that that gentleman had just returned from the Muttuck country, to which he had taken the Chinese tea manufacturers, with the view of ascertaining practically what will be required for the manufacturing process, on a large scale, when the proper season arrives.

Mr. Bruce states, that assistants are the first requisite; and he proposes to employ 12 of his takelahs as such, and to raise their pay from five to ten rupees a month as soon as the Chinese shall declare them duly qualified. As soon as this is the case, he will distribute them over the country, so as to instruct the natives of the villages at which the tea abounds.

The plant is now found to be much more generally diffused over the Muttuk country than he had supposed, seven new spots where it grows having been brought to Mr. Bruce's notice during his last trip; and further observation has served fully to establish the expediency of clearing away the jungle, and cutting down the tea trees close to the ground, in order to improve the quality of the foliage. From the new shoots of plants that had been thus treated, Mr. Bruce has prepared five boxes of tea, a sample of which he has forwarded to Captain Jenkins, for despatch to Calcutta. Mr. Bruce observes, that this tea must not be regarded as a fair specimen of the best sort of tea that the Assam plant is capable of producing. It will require to be kept in a dry place for at least six months, to take off the raw taste incidental to new-made tea; it has, besides, been prepared out of season, and not by the proper process.

Mr. Bruce feels greatly the want of a second assistant; the first to be employed in the Muttuk country, and the second amongst the Singfoos; and we beg to recommend that he should be authorized to engage one accordingly, as a temporary measure, and on a salary not exceeding 70 rupees per mensem, as formerly proposed. Both assistants may be dispensed with as soon as the produce of Assam has fairly attracted the attention of merchants, who will then elicit the capabilities of the tea districts far more effectually than can be done by any public functionaries, even were each to be animated by such extraordinary zeal, and guided by such intelligence, as Mr. Bruce has displayed throughout, from his first discovery of the existence of the tea plant in Assam down to the present moment.

We have, &c.

(signed) *J. Pattie.* *C. E. Trevelyan.*
J. W. Grant. *C. K. Robison.*
Ross D. Mangles. *N. Wallich.*

Calcutta,
12 January 1837.

Ordered, That the Tea Committee be informed, that, as recommended, the Right honourable the Governor-general of India in Council authorizes Mr. Bruce, superintendent of tea nurseries in Assam, to engage a second assistant, on a salary not exceeding 70 rupees per mensem, as a temporary measure.

Ordered, That the necessary communication on the subject be made to the civil auditor.

EXTRACT INDIA REVENUE CONSULTATIONS, 17 April 1837.

No. 17.

From *N. Wallich*, Esq., M. D., Secretary to the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Government of India; 4 April 1837.

Sir,

I AM directed by the Tea Committee to request that you will please to lay before the Right honourable the Governor-general of India in Council the accompanying copy of a letter from Assistant-surgeon Griffith, dated at the foot of the Patkoe hills, the 2d ultimo.

2. With respect to the bitter tea (beir fullap, or feeta fullap), mentioned in paragraph 3, the Committee have ascertained, from a number of dried specimens in flower, as also some capsules and seeds forwarded to them by Mr. Bruce, that the plant in question is undoubtedly a species of camellia. Mr. Bruce found it near Koojoo, in the Singfo country, in the month of December last, and the Chinamen who are stationed with him recognised it as a shrub which grows near the tea in their own country, but which is not used as such, and which produced a nut yielding an oil (meaning, probably, camellia oleifera of China). The same shrub was found by Mr. Griffith and myself in the Muttock country, and it affords an additional instance of similarity between the flora of some of the tea provinces in China and of the tea tracts in Upper Assam.

I have, &c.

(signed) *N. Wallich*, M.D.,
Secretary to the Tea Committee.

Tea Committee's Office,
Hon. Company's Botanical Garden,
4 April 1837.

From Assistant-Surgeon *William Griffith*, Madras Establishment, to the Secretary of the Tea Committee; 2 March 1837. No. 18.

Sir,

I HAVE the honour of forwarding to you my pay-bills for February, with the requisite documents, for the inspection of, and signature of, the Chairman of the Committee.

2. I met with Captain Hannay, on the 12th February, at Namroop Putar, to which place I had accompanied Major White, the political agent for Upper Assam; since which time my movements have necessarily been dependant on those of the former officer.

3. No tea has been met with during the march, and I am hence more than ever satisfied, that the prevailing accounts of its occurring as a decidedly hill plant are wholly ungrounded. The bitter tea of Mr. Bruce, bunfullap of the Assamese Donaniers, was found by me extensively on the summit of a hill, the elevation of which is about 1,000 feet, where it occurs as a tree of small size. It is used, I believe, solely as a medicine. At present I am unable to state whether it is a camellia or a tea, although the dehiscence of the fruit is that of the latter genus; from the tea it is at once known, independently of its very different habit, by its having the buds covered with scale. This plant was, I believe, first found by Dr. Wallich at Tengrei, where, however, it only occurs as a shrub.

4. On the Namroop I had the pleasure of ascertaining the existence of coal, of excellent quality, in abundance, and in a situation affording every facility for its being worked, and to a considerable degree for its being deported. At Namroop, putao petroleum is very abundant.

5. I have, in conclusion, the honour of informing you, that Captain Hannay intends moving on to-morrow for Ava, on which day we shall reach the Burmese frontier; it having been satisfactorily ascertained, that the Meervoon evinces no tendency towards effecting a meeting with the Assamese authorities, in the hopes of being present at which Captain Hannay has hitherto waited.

(signed) *W. Griffith*,
Assistant-surgeon, Madras Establishment,
attached to Assam Department.

Yoonsam,
Foot of the Pakoye,
2 March 1837.

EXTRACT INDIA REVENUE CONSULTATIONS, 13 May 1837.

(No. 19.)—From Captain *F. Jenkins*, Agent to the Governor-general, to *G. J. Gordon*, Esq., Secretary to the Tea Committee: 19 January 1837. No. 31.

Sir,

I HAVE the honour to forward the accompanying copy of a letter, of the 20th ultimo, from Mr. Bruce, for the consideration and orders of the Committee.

2. The proposition in the 3d paragraph of Mr. Bruce's letter, to employ Doanees to learn to make tea under the Chinamen, appears to me worthy of adoption; but it is much to be desired, if the Committee are of opinion that the plants are of the green-tea variety, we should get green-tea makers immediately.

I have, &c.

(signed) *F. Jenkins*,
Agent to Governor-general.

Office of the Governor-general's
Agent, Cooch Behar,
19 January 1837.

From *C. A. Bruce*, Esq., Superintendent of Tea, to Captain *F. Jenkins*, Agent to the Governor-general; 20 December 1836.

Sir,

I HAVE the honour to report to you, that I have been to the tea tracts in the Muttuk country with the tea-makers, to show them our tea plants, and to see if we could make any tea, although not exactly the season; and also to ascertain their wants before commencing operations in March. Numerous are their wants, but they are chiefly such as we can get in the country. They appeared delighted and astonished at our tea-trees, and declare that they are precisely the same as in China, only ours are overgrown. They made tea from the youngest leaves that could be collected, and also some of the middling and largest kind, which I have the honour to forward. After I had collected all the leaves required by us, I cut down all the tea plants, large and small, and set fire to the whole at No. 2 jungle; but at Dunjay and at Chabwah I only cut down the old trees, keeping those plants from two to three feet high.

2. It is my intention to go to the Singpho country as soon as I can procure elephants and coolies, and the Chinamen have had four days' rest, as they only arrived to-day.

3. As I have only two tea-makers, the business falls heavy on them; and when the season arrives to make the tea, they alone will be able to make but a little. They have requested me to apply to you for assistants. I would suggest, that 12 men should be allowed them, to be taught to make tea, in case of these two men falling sick, or being cut off by death. I would propose to convert all my takelas into tea-makers, as their assistants, and when the Chinamen thought they were able to make tea of themselves, their salaries to be increased to 10 rupees per mensem; thus there would be a stimulus to encourage men to learn quickly: we should then be able to divide ourselves into parties all over the country, and collect the leaves when in season; whereas now, only having two Chinamen, before we have finished the first gathering in March in Muttuk, the leaves in the Singpho country will be too old, and thus be lost for want of tea-makers. I have no doubt, but in a year or two, we should be able to turn out a few men able to make tea; as those men, called Dewannies, who have been amongst the Singfos, are already half taught, and have only the finer parts of the process to learn.

4. My accompanying the Chinamen from one place to another leaves me no time to visit and explore the country to that extent that my wishes incline me.

5. I have much pleasure in informing you, that I have discovered seven new tea tracts in the Muttuk country. Plenty of wax-cloth of the best kind ought to be sent up directly for the covering of the tea-boxes.

I have, &c.

Suddeeah, 20 December 1836.
(signed) *C. A. Bruce,*
Superintendent of Tea.

No. 34.

(No. 33.)—From Captain *Jenkins*, Agent to Governor-general N. E. Frontier, to *N. Wallich*, Esq., M.D., Secretary to the Tea Committee, Calcutta; 15 February 1837.

Sir,

WITH reference to your predecessor's letter of the 22d November last, I have the honour to submit a copy of a letter from Mr. Bruce, under date the 20th December 1836, detailing his age and services.

2. Mr. Bruce has been in the service of Government, in command of gun-boats, since the commencement of the Burmese war, and his services have given entire satisfaction, and been noticed with much approbation by Government.

3. With regard to the provision that it would be reasonable to allow Mr. Bruce's family, in case of his death, on which I am requested to give an opinion, I am rather at a loss on what principle I should make my recommendation. You will be aware that the insurance offices have been pleased, inconsiderately I think, to except residents in Assam from the benefits of their institutions. Were this not the case, I should have suggested that Mr. Bruce should receive an addition to his pay, sufficient to enable him to insure his life in a reasonable sum, an amount perhaps calculated to give his widow the pension of a subaltern in the army. I believe, however, that Mr. Bruce is eligible to become a member of the Uncovenanted Servants' Fund, if that institution has been formed, of which I am not able to inform myself at present; and if so, the

Government might be pleased to allow him such an addition to his pay, whilst in his present employ, as would secure a pension for his widow, calculated as above proposed.

I have, &c.
(signed) *F. Jenkins*,
Agent to Governor-general.

Office of Governor-general's Agent,
North-East Frontier,
15 February 1837.

From *C. A. Bruce*, Esq., Superintendent of Tea, to Captain *F. Jenkins*, Agent to Governor-general, Gowahatty; 20 December 1836.

Sir,

I HAVE the honour to acknowledge the receipt of your letter of the 20th instant, and its enclosures, referring to my services under Government and my age.

2. I left England in 1809, as midshipman, on board the H. C. ship Windham, Capt. Stewart, and was twice captured by the French on my way out, after two hard-fought actions; was marched across the Isle of France at the end of the bayonet, and kept prisoner on board of a ship until that island was taken by the British; thus I suffered much, and twice lost all I possessed, and was never remunerated in any way. I afterwards went as an officer of a troop ship against Java, and was at the taking of that place.

3. At the breaking out of the Burmah war, I offered my services to Mr. Scott, then Agent to the Governor-general, and was appointed to command gun-boats. As my command was at Suddeeah, I was the first who introduced the tea seeds and plants, and sent them to Mr. Scott, and other officers below. My late brother, who was in Assam before the breaking out of the war, had previously informed me of their existence; and it was I who verbally informed you of it, and officially brought the subject to your notice in 1833, giving a description of the method of making the tea by the natives. I was the first European who ever penetrated the forests, and visited the tea tracts in British Suddiya, and brought away specimens of earth, fruit, and flowers, and the first who discovered numerous other tracts.

4. It was my good fortune last year to go against the Duffa Gaum, and his followers, who threatened to over-run our frontier, and it was my good fortune to expel him twice with my gun-boat from two strong positions; for this little service I was honoured with the thanks of the Governor-general in Council.

5. I was born on the 10th of January 1793. I have eight persons to support, including myself and my late brother's children. No 44.

I have, &c.
(signed) *C. A. Bruce*,
Superintendent of Tea.

Suddeeah, 20 December 1836.

From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to the Tea Committee; 13 March 1837. No 35.

Gentlemen,

I AM directed to acknowledge the receipt of your letter, dated the 27th ult., stating the scale of remuneration which should be awarded to the men who are taught the art of manufacturing tea, and forwarding a communication from the Agent to the Governor-general in the N. E. frontier, on the subject of augmenting the salary of Mr. Bruce; and of one from your secretary, dated the 3d instant, submitting a communication from Mr. Bruce, reporting further discoveries of tea tracts, and the neglect of the Singphoos.

2. In reply, I am desired to acquaint you, that the Governor-general of India in Council approves and sanctions the scale of remuneration now suggested for the individuals who may acquire the art of tea-making, viz.:

1st. That 12 takelas receive a reward of 30 rupees each on their being within a reasonable time found proficient in the manufacture of tea; and

2d. That those among them who have gained the reward, be paid at the rate of 10 rupees a month each, whenever they are detached from their ordinary duties as takelas, either for the purpose of manufacturing tea, or instructing others in the art.

3. His Lordship in Council understands that the Uncovenanted Servants' Fund has not been formed, and he is not aware of any means by which provision could be secured to the family of Mr. Bruce in the event of his death.

4. Your secretary's letter of the date quoted, seems to require no order at present.

Council Chamber,
13 March 1837.

(signed) *W. H. Macnaghten*,
Secretary to Government of India.

No. 37. (No. 43.)—From Captain *F. Jenkins*, Agent to the Governor-general N. E. Frontier, to *N. Wallich*, Esq., M.D., Secretary to the Tea Committee; 20 February 1837.

Sir,

I HAVE the honour to forward a copy of a letter of the 10th instant, from Mr. Bruce, superintendent tea plantations.

2. Mr. Bruce reports the discoveries of further tea tracts, and he complains of the apathy of the Singphoos; for this evil it will not be difficult to find a remedy, I hope, when the tea becomes to be largely worked, by encouraging the emigration of more industrious races from Chota, Nagpore, or elsewhere; but in the present state of our preparations, in regard to the manufacture of tea, it does not appear immediately necessary to offer any more particular suggestions.

I have, &c.
(signed) *F. Jenkins*,
Agent to Governor-general.

Office of the Governor-general's
Agent, N. E. Frontier,
20 February 1837.

From *C. A. Bruce*, Esq., Superintendent of Tea, to Captain *F. Jenkins*, Agent to the Governor-general, Gowahatty; 10 February 1837.

Sir,

I HAVE the honour to report to you my arrival at Suddeeyah, from a tour of the Muttock and Singpho country. I have discovered plenty of tea in the former; in fact the whole of the Muttock is a tea country. There is plenty of tea in the Singpho country also, and some of the tracts very large, larger than I have seen in Muttock; but I am sorry to say that I cannot get the Singphoos to do as I wish; they work how and when they please. They are under no control, and wish not to work at all; the underwood of the two tracts they have in a great measure cleared, and one tract they cut down, but the wood was not removed. They told me that they would not clear the jungle when it grows up; so I am afraid the tea in our own country, *i. e.* the Singpho country, cannot be available, unless we import men to make the Singphoos more industrious. The Singphoos are all under their own petty chiefs, so coolies cannot be had, and these men will not work for any as long as they have sufficient opium and rice of their own. As long as coolies can get four rupees per month at Suddeeyah, they will never go to the Singphoos for that sum.

I have, &c.
(signed) *C. A. Bruce*,
Superintendent of Tea.

Suddeeyah, 10 February 1837.

EXTRACT INDIA REVENUE CONSULTATIONS, 25 September 1837.

No. 20. From *N. Wallich*, Esq., M.D., Secretary to the Tea Committee, to *W. H. Macnaghten*, Esq., Secretary to Government of India; 5 September 1837.

Sir,

I AM directed by the Tea Committee to forward to you, for the purpose of being submitted to the Right honourable the Governor-general of India in Council, the accompanying highly interesting and valuable report of Mr. Griffith on the tea plant of Upper Assam, together with a sample of the Assam "souchong tea," received a few days ago from Mr. Bruce, and which, in the opinion of the Committee, affords a most promising indication of the success which may be reasonably anticipated will attend the endeavours now employed to cultivate and produce profitable and merchantable tea in Upper Assam.

2. I am instructed to state, that the Committee hope Mr. Griffith may be considered deserving of the high distinction of the approbation of his Lordship in Council.

I have, &c.

(signed) *N. Wallich*, M.D.,
Secretary.

Tea Committee's Office,
Hon. Company's Botanic Garden,
5 September 1837.

Extract India Revenue Consultations, 11 December 1837.

Extract Resolution of Government, dated 11 December 1837. No. 3.

The injunctions of the Honourable Court, that the operations undertaken in order to ascertain whether marketable tea can be grown and manufactured in India should be considered strictly experimental, will be carefully borne in mind. Indeed that principle, upon which the inquiry was commenced, has never from the first been lost sight of. The "deep interest" which the Honourable Court have expressed in the experiment, is highly encouraging to the Government; and they trust that in a short time they shall be in possession of data sufficient to guide them to a safe conclusion as to its result, which they see reason to hope will be successful.

2. No time will be lost in bringing matters to this issue; and no expense not considered essential to the fair trial of the experiment will be incurred.

3. A copy of the despatch will be immediately forwarded to the Tea Committee, and their attention particularly drawn to paragraphs 34, 35, and 36. Intimation of the failure of the tea seeds sent to Madras was conveyed to the Honourable Court in paragraph 29 of the despatch from this department, dated 30th January 1837, No. 2. Dr. Griffith's report, adverted to in paragraph 31 of the Honourable Court's letter, has been received, and will be forwarded by an early opportunity. The Committee will be requested to furnish, with the least practicable delay, the reports of Drs. Wallich and M'Clelland, and Mr. Gordon, which have been long expected. A specimen of the tea of Upper Assam, prepared by the most careful process of manipulation of which the means at the command of the Committee admit, will also be forwarded by them to this department, for transmission to the Honourable Court, as desired by them in paragraph 19 of their despatch.

From *N. Wallich*, Esq., M.D., Secretary to the Tea Committee, to *R. D. Mangles*, Officiating Secretary to Government of India, dated the 30th Nov. 1837. No. 7.

Sir,

I am directed by the Tea Committee to request that you will have the goodness to submit to the favourable consideration of Government the following proposition, originally made to them by Captain Jenkins, for attaching a small number of apprentices to Mr. Bruce's establishment in Upper Assam.

2. In proportion as the various operations now carried on for the purpose of bringing the native tea of that country into the market are advancing towards maturity, a number of additional assistants will become necessary at the several branches of the establishment, who may be capable of supervising the cultivation of the plant itself, as well as conducting the manufacturing process. In order to meet this demand, it appears highly desirable that a timely provision should be made for the supply of a number of men not altogether unacquainted with the sort of work that will be required of them, nor yet quite strangers to the country where they will have to reside. Under existing circumstances, the first object is only to be attained by procuring properly qualified people from

China, an undertaking which would be attended with very considerable expense; while the plan of placing some apprentices under Mr. Bruce, for the express purpose of being trained for future employment, would enable the Government, in the lapse of a few years, to dispense altogether with the costly, and, as experience has fully proved, very arduous, importation of Chinamen.

3. But it is not on the score of economy alone that the plan recommends itself for adoption; there is another point to which allusion has already been made, which pleads very strongly in its favour. The climate of Assam, especially of the tea tracts, is admitted to be inimical to the health of most classes of new comers. Of this fact a sad example exists in the death of the Chinese interpreter some months ago. It may reasonably be expected that as the country becomes by degrees relieved of the vast jungles which at present oppress it in all directions, this state of insalubrity will gradually diminish; but in the meantime the difficulty arising from that source admits of being greatly palliated by inuring a number of healthy and strong youths to the influence of the climate. The youth itself of the boys will prove a guarantee for their preserving their health, under the judicious care, vigilance, and precaution which Mr. Bruce will not fail to bestow on them.

4. The Committee, accordingly, beg leave most strongly to second Captain Jenkins's proposition, combining as it does economy with great usefulness, and to recommend that the Honourable the President in Council will please to authorize their engaging eight apprentices from the Lower Orphan Institution, or the Free School, with the usual allowances to the person in charge for feeding and clothing the boys, which will amount to a very moderate sum, probably not exceeding 16 rupees for each. It is scarcely necessary to observe, that the free assent of the boys will form the basis of their being articled.

5. In the event of his Honor in Council concurring in these views of the Committee, it is their intention to get two of the boys properly instructed in the art of making leaden canisters, previous to sending them to their final destination, as it has been found as impracticable to prevail on native maistrys to go to Assam, as to persuade Assam workmen to come to Calcutta on purpose to be taught the art. The Committee entertain no doubt that Mr. James Prinsep will grant them his valuable aid on this occasion, with the same readiness which distinguishes his exertions to promote all the works of public utility.

I have, &c.

(signed) *N. Wallich*, M.D.,
Secretary.

Tea Committee Office,
Hon. Company's Botanic Garden,
30 November 1837.

No. 8. (No. 116.)—From *R. D. Mangles*, Esq., Officiating Secretary to the Government of India, to the Tea Committee, dated 11 December 1837.

Gentlemen,

I AM directed by the Honourable the President in Council to acknowledge the receipt of your secretary's letter of the 30th ultimo, recommending, for the sanction of Government, "a proposition, originally made to you by Captain Jenkins, for attaching a small number of apprentices to Mr. Bruce's establishment in Upper Assam," in order to the better carrying on of the experimental cultivation and manufacture of tea in that quarter.

2. In reply, I am directed to refer you to the despatch from the Honourable Court of Directors, under date the 23d August last, this day forwarded to you, and to the sentiments of Government, frequently expressed, in regard to the strictly experimental nature of the operations now in progress at the public expense. Those operations it was never intended to extend beyond the point of ascertaining that marketable tea could be grown and manufactured in British India; the carrying out of the experiment into practice upon such a scale as to render the production of the article a mercantile speculation, was never

contemplated by Government, whose part will be abundantly fulfilled as soon as the practicability of the plan is established.

3. It appears, however, from your secretary's letter, and especially from its second paragraph, that the views of Government have not been correctly understood by the Committee. It is not the intention of his Honor in Council to employ a large establishment, with "several branches," and requiring "a number of additional assistants," still less is the maintenance of the experiment during, and even beyond, "the lapse of a few years," contemplated. On the contrary, it will be the duty of your Committee, under the instructions of the Honourable Court this day communicated to you, to take active measures to bring the experiment to the critical point, of ascertaining whether marketable tea can or cannot be produced, with the least possible delay.

4. The President in Council does not think it consistent with these views of the legitimate object of the inquiry, to sanction the attachment of apprentices to Mr. Bruce, who could not, for a considerable period, render any useful service to the operations of that gentleman, and who would certainly have embarrassing claims upon the Government in the event of the failure of the experiment, or of its not being immediately taken up by individual enterprise.

I am, &c.
(signed) *R. D. Mangles,*
Officiating Secretary to the Government of India.

Council Chamber, 11 December 1837.

EXTRACT INDIA REVENUE CONSULTATIONS, 29 December 1837.

From *N. Wallich*, Esq., M.D., Secretary to the Tea Committee, to *R. D. Mangles*, Esq., Officiating Secretary to Government of India, dated 12 December 1837. No. 6.

Sir,

I AM directed by the Tea Committee to send you the accompanying four pint bottles, containing samples of the following first crops of Muttuck teas, and to request that you will please to submit them to the Government; viz.

A.	Souchong,	No. 1,	Major Gohyne's shady tract.
B.	Ditto -	No. 1,	Chubwa sunny tract.
C.	Ditto -	No. 1,	Dunjoy sunny tract.
D.	Paho -	No. 3,	Tingri shady tract.

2. The Committee deem it worthy of notice, that notwithstanding two pint bottles of B. and D. had broken on the road, their contents, which were found loose among the dry straw in the bunghy boxes, had apparently not lost any of the aroma of good and fair tea. This circumstance, together with the quality of the samples generally, furnish, in the opinion of the Committee, additional and very satisfactory proofs of the success with which tea may be produced in Assam.

I have, &c.
(signed) *N. Wallich*, M.D.,
Secretary.

Tea Committee Office,
Hon. Company's Botanic Garden,
12 December 1837.

(No. 1.)—From *R. D. Mangles*, Esq., Officiating Secretary to the Government of India, to *N. Wallich*, Esq., Secretary to the Tea Committee, dated the 29th December 1837. No. 7.

Sir,

I AM directed to acknowledge the receipt of your letter, dated the 12th instant, and to inform you, in reply, that the Honourable the President in Council concurs with the Committee in considering the quality of the samples which they have sent, with reference to the short period that has elapsed since the commencement of the experiment, to be very satisfactory. Specimens will be forwarded by dák, with a copy of this correspondence, to the Right honourable the Governor-general.

I am, &c.
(signed) *R. D. Mangles*,
Officiating Secretary to the Government of India.

Council Chamber, 29 December 1837.

EXTRACT INDIA REVENUE CONSULTATIONS, 15 January 1838.

No. 13. From the Tea Committee, to *R. D. Mangles*, Esq., Officiating Secretary to Government of India; 30 December 1837.

Sir,

WE have the honour to acknowledge the receipt of your letter, No. 115, dated the 11th instant, enclosing copy of a despatch from the Honourable Court of Directors, dated the 23d August last, and of the Resolution of the Government thereon; also of your letter, No. 116, of the same date, replying to our secretary's of the 30th ultimo.

2. We have perused the above-mentioned records with due attention, and deep interest; and we take this early opportunity of assuring the Honourable the President in Council, that at no stage of our proceedings or recommendations have we contemplated or intended anything more than strictly experimental operations, to ascertain whether marketable tea could be grown and manufactured in this country. To this object our attention has been steadily and exclusively directed, from the first commencement of our labours; and to it we will continue to confine them, until the services of our Committee are not any longer required by the Government. The proposition which we submitted in our secretary's last letter, of 30th ultimo, had no other object in view. We considered it to be a matter of unquestionable and real importance, to the successful prosecution of the operations now experimentally in progress, to ascertain practically, and at a trifling expense, whether the climate of Assam presents any serious difficulties, or whether its reputed insalubrity is only such as may be overcome with ease, in the way we have suggested.

3. We beg leave respectfully to urge on the consideration of his Honor in Council, that the experimental operations now in progress at the tea tracts in Assam require, not only time and careful perseverance to bring them to any degree of perfection, but likewise to be carefully preserved, in order to encourage private speculation, whenever it may be deemed advisable to commit the future extension and profitable success of this experimental trial entirely individual enterprise. This view seems to us to be in perfect accordance with the original intention of the Government, sanctioned in the Honourable Court's letter now before us, and distinctly founded on the principle, that the Government are eventually to withdraw entirely from all further prosecution of the scheme, and, as soon as it may appear to be expedient, to entrust its future success to private speculators, but not earlier. As yet, however, there has not been time enough to redeem the tracts in question, to place them in a proper course of management, and to obtain from them such perfect samples of their produce as will be unquestionably required before an intimate decisive judgment can be pronounced on the quality of that produce. Several specimens of tea of the Assam manufacture have already been laid before Government this year, which have been considered as very encouraging; and we are happy to report, that a considerable quantity, prepared during the last season, is now on its way to Calcutta, which, when received, will be forwarded to Government, with a recommendation that it be transmitted to the Honourable Court, who may probably consider it worthy to be submitted to the greatest of all tests, that of the London tea dealers. In the meantime, we have the satisfaction of forwarding herewith a large canister of tea, recently received from Mr. Bruce, superscribed "Kanung Suchong, shaded tract," which we solicit may be sent to the Honourable Court by an early opportunity. Respecting this package, it may be proper to state further, that the canister itself, as well

as the sheet-lead of which it was made, have been manufactured, as a first attempt, under the able supervision of the assay-master, Mr. J. Prinsep, and that the leaves surrounding the canister on the outside, resembling very closely those used in similar tea-packages from China, are of the gigantic martaban bamboo, cultivated in Honourable Company's botanic garden.

4. We will carefully attend to the instructions contained in your letter, No. 115, and will call on Messrs. Gordon and Wallich to furnish their reports without further delay. With regard to Mr. M'Clelland's very able report, we beg to observe, that it has been long ago printed and published in the 4th volume of the Transactions of the Agricultural and Horticultural Society of India, to whom it was presented for that purpose by the Government. The valuable memoir of Mr. Bruce on the manufacture of tea, as at present practised by the Chinese under his directions in Upper Assam, is in the press of the Orphan School, conformably to the orders of Government.

We have, &c.

(signed) *J. Pattle.* *Ross D. Mangles.*
J. W. Grant. *Radhakant Dev.*
Calcutta, *C. K. Robison.* *N. Wallich*, M.D.
30 December 1837. *Ram Comul Sen.*

EXTRACT INDIA REVENUE CONSULTATIONS, 7 February 1838.

From *W. H. Macnaghten*, Esq., Secretary to the Government of India with the Governor-general, to *R. D. Mangles*, Esq., Officiating Secretary to the Government of India, dated the 15th January 1838.

Sir,

I AM desired by the Right honourable the Governor-general of India to acknowledge the receipt of your letter, No. 4, dated the 29th ultimo, submitting correspondence with the Tea Committee, together with four samples of the first crops of Muttuck teas.

2. In reply I am directed to observe, that the tea would, in the opinion of his Lordship, be considered as of a marketable quality, if it could be landed in Europe in the same state in which it has been received here, and he trusts that measures will shortly be taken for sending a few chests, upon trial, to the Honourable Court. His Lordship concludes that, in the present stage of the undertaking, it is deemed premature to form any estimate of the cost of production.

I have, &c.

(signed) *W. H. Macnaghten*,
Secretary to the Gov^{t} of India with the Governor-general.

Head Quarters, Camp Jellulabad,
Zillah Shajihanpore, the 15th January 1838.

(No. 8.)—From *R. D. Mangles*, Esq., Officiating Secretary to the Government of India, to *N. Wallich*, Esq., Secretary to the Tea Committee, dated the 7th February 1838.

Sir,

IN continuation of my letter, dated the 29th December last, I am directed by the Honourable the President in Council to forward, for the information of the Committee, the accompanying copy of letter from the Secretary to the Government of India with the Governor-general, dated the 15th ultimo, relative to the specimens of the first crop of Muttuck tea, which, as stated on that occasion, were sent to the Right honourable the Governor-general.

2. I am desired to take this opportunity of stating, that a despatch to the Honourable Court of Directors, forwarding the teas received, with your and the

Committee's letters, dated respectively the 12th and 30th December last, is now ready, and will be soon forwarded.

I am, &c.

(signed) *R. D. Mangles*,
Officiating Secretary to the Government of India.

Council Chamber, 7 February 1838.

Extract Report on the Tea Plant of Upper Assam, by Mr. Assistant-surgeon *William Griffith*, Madras Establishment, late Member of Assam Deputation.

Part VII.

THE project of the cultivation of tea within the vast extent of territory held by Great Britain in India, cannot have failed to have occurred to the Government at a comparatively early period. Accordingly we find that, so early as 1793, Lord Macartney despatched some plants from China to Bengal, "in some taunton, 2, 466. parts of which, his Excellency had been informed, were districts adapted for their cultivation." From this period until a very late date, when a committee of tea culture was instituted, no further steps seem to have been taken. On 3d March 1834, a circular was issued by the Committee, calling for information on a considerable number of points, the questions being prefaced by a sketch of the information then possessed by the Committee regarding the climate and soil most congenial to the tea plant, as it exists in China. From this document, it will be seen that I have extracted portions, which must generally be allowed to give strong evidence in favour of the correctness of the views entertained of the stations of the plant in the tea provinces of China by Mr. M'Clelland, and which were deduced from a close comparison and analysis of all the data bearing on the point. Yet, in the face of the evidence given in the circular, the questions mostly rest on the idea that the plant is a native of hilly countries, in which snow falls during the cold season; and in accordance with this idea, the Committee subsequently came to the conclusion, that the requisite considerations are to be met with on the Himalayas, and that Kumoun appears to be the most eligible spot. The following steps were, therefore, put into execution: Dr. Falconer was requested to report on the localities which appeared to him advantageous for nurseries; and the secretary to the Tea Committee, Mr. Gordon, was despatched to China to procure seeds and plants for the stocking of the nurseries. In order to render Mr. Gordon's mission more successful, Dr. Wallich was requested to draw up instructions, both as to choice of stock, and their transmission, as well as that of seeds, to Bengal. With regard to the first, Dr. Wallich very properly lays great stress on the care to be exercised in selecting plants and seeds from the very best stocks; and in allusion to the necessity of not selecting any of the plants and seeds commonly sold at Canton and Macao, he says, "such would be as utterly worthless to us as a common crab, or any other raw or wild fruit, to any person anxious to plant a garden with the best and most marketable fruit trees."* With regard to the transmission of plants and seeds to Bengal, Mr. Gordon was presented with the copy of an article published by Dr. Wallich in the Transactions of the Horticultural Society of London for 1832, containing the usual routine instructions, now, since the subject has been more maturely considered, entirely superseded. It is strange, however, that no mention of seeds is made, although their transmission, so far as the tea plant is concerned, is certainly much the more delicate affair of the two. In the course of his missions, Mr. Gordon succeeded in transmitting a great number of seeds to Calcutta, of which one-half germinated; a large proportion, when the mode of packing is considered. While Mr. Gordon was engaged in China collecting seeds and plants, the fact of the existence of the tea in Upper Assam, and that to a great extent, was brought to the notice of the Tea Committee, who gave information of the fact to Government in a letter, dated 24th

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* See Memorandum drawn up by Dr. Wallich for the instruction of Mr. Gordon, dated 18 May 1834.

Journal of Asiatic Society for 1835, pp. 42, 43.

24th December 1834. From this I make the following extracts: "It is proper to observe, that we were not altogether unprepared for this highly interesting event; we were acquainted with the fact, that, so far back as 1826, the late ingenious Mr. David Scott sent down specimens of the leaves of a shrub, which he insisted upon was a real tea; and it will be seen, from the enclosed reports from the Agent to the Governor-general on the north-eastern frontier, and his assistant, that a similar assertion was strongly urged in regard to the existence of the tea in Upper Assam." Now, although reasons certainly existed why the alleged tea might have proved, as the Tea Committee suggested, nothing but a camellia, yet the very fact of a camellia being reported to exist should at once have pointed out the immediate necessity of a proper examination of the plant on the spot, and for these two reasons, first, because it was known in May 1834, that the plant in question was used by the Singphos as tea; and, secondly, because it is not certain whether some species of camellia, so called, do not produce tea.* On this point I quote the following extract from Dr. Lindley's Introduction to the Natural Orders: "The tea which is extensively consumed by Europeans is produced by different species of thea or camellia." The examination which was recommended by Captain Jenkins on the 7th May 1834, was recommended by the Tea Committee in December of the same year, and received immediately the sanction of the Government. On the fact being proved to the satisfaction of the Tea Committee that the tea plants really did exist in Assam, Mr. Gordon was directed to suspend all further operations regarding the supplies of tea seeds, &c., and ordered to proceed to Bengal, unless his meditated excursion to the green-tea districts remained unaccomplished, when a further period of precisely two months was allotted to him. On this subject, I cannot refrain from quoting the following extracts from the proceedings of the Tea Committee on the 2d February 1835, and from Dr. Wallich's accompanying letter to Mr. Gordon: "With reference to the communications which the Tea Committee have received about the Upper Assam tea, and its identity with the genuine tea of China; considering, also, that in all probability the Bohea tea seeds lately imported from China will not produce that variety here; and that, according to the accounts before the Tea Committee from Captain Jenkins and Lieutenant Charlton, the Assam plant exists in sufficient abundance to produce seeds for all the purposes of the Committee, with this great advantage, that they can be procured in a state of perfect freshness; finally, taking into consideration the great expenses necessarily incurred in obtaining supplies of seeds from China, which are now ascertained to be no longer required." Here follows the determination of recalling Mr. Gordon. The extracts from Dr. Wallich's letter runs thus: "The Committee have maturely weighed the subject of the new discovery in Upper Assam, in all its bearings. The genuine tea grows there as an indigenous plant, which may be cultivated to any extent. There is no ground for supposing that the various sorts of tea seeds imported from China will produce anything but the shrub in its natural state, retaining nothing of the variety whose name the seeds bear: it is, therefore, useless and unnecessary to import from China, at a great expense and great risk, what may be had, as it were, on the spot, to any extent almost in point of quantity, and in a state of perfect freshness and strength for vegetating, your continuance in China, so far as regards supplies of seeds, is, therefore, useless and unnecessary."

Dated February 8, 1835.

"The Assam discovery has placed the labours of the Committee on quite a different footing from that on which they commenced. Who can say what may be the effect of that truly magnificent discovery? The question is now no longer, whether the tea will grow in Hindostan, or whether it produces leaves fit for use (the Assamese and their neighbours, not to mention the Yunamese, consume vast quantities of them), scarcely whether or not the leaf admits of being prepared in the same manner as is done in China for infusion, but simply whether the shrub can be extensively cultivated for commercial purposes, and whether it admits of being introduced into Kumaon, Sirmore, and the like north-west parts of the country, for the Committee have not had cause to alter their views in respect to the capabilities of other places since you left us."

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* *See* extract of a private letter from Capt. F. Jenkins to G. J. Gordon, Esq., dated 19 May 1834 Journal of Asiatic Society, Calcutta.

From the above extracts, two circumstances of sufficient importance may be deduced; of these the first is, that had the attention of the Committee been directed *ab origine* towards the place where the plant was reported to grow, there would have been no occasion for the importation of seeds from China, and thus large sums of money would have been saved to the Government. The second involves considerations known only to those who have some acquaintance with the higher branches of botany. The statement made in the above extracts, "that in all probability the Bohea tea seeds lately imported from China will not produce that variety here;" and the same repeated in the letter of Dr. Wallich, "there is no ground for supposing that the various sorts of tea seeds imported from China will produce anything but the shrub in its natural state, retaining nothing of the variety of whose name the seeds bear," are grounded no doubt on the idea, that seeds propagate the species, and buds the individual. It is to a certain extent perhaps true, and although a gardener planting the seeds of an excellent apple would not expect that all the plants springing from such seeds would inherit the excellencies of that from which the seeds are taken, yet I presume he would not prefer taking seeds from a wild crab-apple, or hope by so doing for equal success. I may be allowed here to quote the words of the leading authority in England as bearing on this point, "in sowing seeds for the purpose of procuring improved varieties, care should be had not only that the seeds be taken from the finest existing kinds, but also that the most handsome, the largest, and the most perfectly ripened specimens should be those that supply the seed. A seedling plant will always partake more or less of the character of its parent, the qualities of which are concentrated in the embryo when it has arrived at full maturity."[*] Nor can I reconcile the extracts alluded to with the memorandum of instructions furnished by Dr. Wallich to Mr. Gordon, on which so much stress is laid on ascertaining the excellence of the stock from which both plants and seeds are to be obtained.

It may be further submitted, how does the argument, at least now that the nature of the Assamese product is known, agree with the acknowledged fact, that the propagation of the tea plant in China is almost entirely carried on by seeds. I take it for granted that the tea of China is superior to that of Assam; but as that tea is the produce of seedlings which, it is said, only inherit the properties of the shrub in its natural state, it follows that the tea plant of China is naturally possessed of higher properties than that of Assam. Against this, the nature of thes oil of the tea districts of China, &c. may possibly be urged; but in the present state of our knowledge, nothing can be adduced to support the natural superiority of China, in any one qualification for producing tea, over the province of Assam.

It is in this question that the whole system rests; if the statement be sound, then indeed the present plan of culture will answer, and some slight modifications will alone be required. But I have no hesitation in saying, that it is contrary to the experience of horticulturalists in all ages. If the tea plant be a true species, it will continue to produce its like from seed; if it be a variety only, the seedlings may be inferior or they may be superior to the parent plant.

Dr. Wallich's statement is abundantly disproved by the very genus in question, all the beautiful varieties of camellia having been raised from seed. Of the plants raised from the seeds sent by Mr. Gordon, about half were sent into the hills, a few to Mysore, on the recommendation I believe of Colonel Morison, the remainder to Assam. These last, when seen by the deputation in February 1835, were diminished to about 12,000, so that the alleged invigorating influence of the Assamese or congenial atmosphere must have been transitory.[†] By far the greater

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[*] Lindley's Introduction to the Guide to the Orchard and Kitchen Garden, p. ix. x.

[†] The distribution of the plants was as follows:

Assam	20,000
Kumaon and its neighbourhood	20,000
Madras Presidency	2,000
	42,000

• Of the Kumaon plants I have no intelligence. Some report on their present state would be interesting. The accounts of those sent to Madras are satisfactory.

greater number had been packed in boxes, a few in large earthen pots or goomlahs. The difference in the state of the contents of the boxes and goomlahs was immense; the few living plants in the boxes were decidedly unhealthy, in the goomlahs they were perfectly healthy, and so thick that the hand could not have been thrust between them; this great excess in favour of the pots naturally leads us to the consideration of the cause of the difference; but this is not all, as many seeds were sent to the hills to be there planted, why was not the same plan carried into execution with regard to Assam?

The largest portions of the tea seeds procured by Mr. Gordon in China, were sown in the earth at the botanic gardens. When the plants were a few inches high, they were transplanted into boxes and flower-pots; a few were sown in goomlahs and not transplanted; and lastly, a few were planted in goomlahs.

The sowing the seeds of woody plants in the earth, and then transplanting into pots or boxes, is contrary to the practice of all experienced nurserymen in England, except when stunted specimens of large growing trees are required. Had the seeds been sown at the first in goomlahs or in boxes, there is little doubt but that they would have reached Assam in a flourishing condition. Plants extract nourishment from the soil by means of the spongioles of their roots, which spongioles are situated at the extremities of the roots. The tea seedling in its first stage produces a long perpendicular root, two or three times the length of the stem, so that when the young plants are three inches above the ground, their roots are probably six or eight inches deep, having very few, if any, lateral fibres; in this stage it is very difficult to transplant them without destroying the spongioles, and the plants are not sufficiently strong to produce new ones before the top withers for want of nourishment. This in part accounts for the plants in goomlahs having borne the journey better than those in boxes; but it appears that those transplanted into goomlahs still looked much better than those in the boxes; this is easily accounted for; earthen vessels are better suited to the growth of plants than wooden ones, and especially so during heavy rains; the superfluous water is carried off with much more facility, and the plants are kept constantly moist, but do not remain saturated. In large boxes there is a large quantity of earth which holds a large quantity of water, and the sides of the boxes become sodden, and the plant rots. Let me still further trace the progress of these unfortunate plants. A spot was fixed upon (as a nursery) by the deputation at Chykwa*, appearing to possess the requisite peculiarities of soil and situation. The spot was completely cleared for the reception of the plants, and after a considerable time had elapsed, owing to the difficulty of procuring labourers, they were at length, under the superintendence of Mr. Bruce, and of a malie from the botanic gardens, removed to their final destination. About August I visited the nursery with Lieut. Millar, commanding at Sadiya, and Mr. Bruce. To my great astonishment, not 500 of the plants were alive, and of these almost all appeared in the last stage of decline. The ground was literally matted down with low tenacious weeds; and it is a fact that on our arrival at the nursery, not a tea plant could be seen, owing to the uniform green colour of the surface. I look upon this nursery, which would, under other circumstances, have contained many thousands of excellent Chinese stocks, to the existence of which I at least attach primary importance, as totally destroyed. The cause of this destruction is beyond doubt to be attributed to the fact, that the plants, which had for several months been under sheds, were in the nursery completely unsheltered from a sufficiently hot sun, the obvious remedy for which would have been the erection of temporary muchowns or mats, by the removal of which at certain times the plants might have become accustomed to that which was to them an excess of solar influence; and that the intervals between the plants, as well as round each, had apparently never been subjected to the operations of a hoe or any other instrument. Having now sketched the fate of the nursery for Chinese plants, I am naturally led to those of the indigenous plants. The original nursery at Sadeya was in Capt. Charlton's command, but as a very eligible spot was selected by Mr. M'Clelland, behind that of Mr. Bruce, the plants were subsequently removed thither, together with some plants of Mr. Bruce's; seeds of indigenous stock were likewise sown. From these shrubs the first tea ever made by Chinese in British India was procured; and although the supply was small, yet I am not aware of its having proved inferior to any subsequently manufactured. The process was seen by no one but Mr. Bruce, and appeared to have been kept a complete secret from every one at Sadeya.

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* Chykwa is a straggling place of some extent, a few miles below Sadya, and on the south or left bank of the river.

This nursery I certainly consider to be thriving; and although considerable expense had been incurred in its formation, and although the Chinese reside at Sadiya, it is now, I believe, abolished, and no theatre of operations for the Chinese now exists near their head-quarters. Let me now turn to the system of operations carried on in the tea localities themselves. But as neither Mr. M'Clelland nor myself were even consulted on this point, I shall confine myself to those put into execution by Mr. Bruce. Orders were first issued to the chiefs of the different districts in which the tea grew for clearing the jungle, and Mr. Bruce proceeded himself to the various spots to see his orders commenced upon. But as this occurred during the rainy season, Mr. Bruce was necessarily unable, with any degree of safety, to protract his stay, and to see his orders efficiently executed. To show the difficulty of working with such tools as the Singphos, I may mention, that on my return from the Mishmee hills in December 1836, the tea locality at Kufoo remained untouched. The first place which was, I believe, cleared to any extent was the Tingrei locality, and to this place I proceeded from Kufoo-doo. That part of the locality which I have mentioned before as having been cleared, was now quite clean, and the first appearance was certainly satisfactory. The shoots which had been given off from the stumps were numerous, giving to the plants a bushy appearance; but this was counteracted by a most palpable coarseness in the texture of the leaves, and was accompanied by an unhealthy yellow tint. The appearance, in fact, was such as to call for exclamations of surprise both from Major White and Lieutenant Bigge, who had previously seen the tea at Gubroo. The flowers were, moreover, totally destitute of odour. Of the other and more extensive portion great part exhibited a scene of considerable confusion; almost all the tea plants had been cut down, the underwood was cleared away, and all the forest trees either felled or in process of being so, the debris were being burnt on the spot among the still living bases of the tea plants.

The only other tea I saw after cultivation had been commenced was at Kufoo-doo, and as here the plan was rational, consisting of a partial clearing of the larger and total of the smaller trees, so the plants had a much better appearance than those before alluded to.

Before entering on the plan which I consider the only one for insuring success, I have to consider the question whether the green and black teas of commerce are the produce of the same species, and modified by culture, soil, and mode of preparation, or whether they are the produce of two distinct species. The question has been much controverted, and must be considered even now as being far from settled. Connected with the tea cultivation in Upper Assam it is of considerable importance, as the Chinese cultivators hitherto imported can only prepare black teas. Indeed this reason has been assigned for the inferior nature of the tea hitherto manufactured in that quarter. The Tea Committee, in the correspondence with Government before alluded to, make use of the following decided remark with reference to the Assam tea plants: "Not only is it a genuine tea, but that no doubt can be entertained of its being the identical tea of China which is the exclusive source of all the varieties and shades of the tea of commerce." And perhaps the generality of systematic botanists entertain the same opinion. Linnæus, however, appears to have considered that these teas were produced by two distinct species. In this he has been followed by Sir W. J. Hooker and Messrs. Loddiges, by which last botanists both the species have been figured. But it is not from botanists in England that we must expect the solution of the question; and as no scientific person has as yet seen it sufficiently often in China, we must be content with leaving the question in *statu quo.* It must be here understood that I attach no importance to the opinions of Abel with regard to the specific differences of the plants affording the two teas. The fact is, the question, like all those involving the differences of plants that have been cultivated from time immemorial is one of extreme difficulty, and will only be solved by long and patient study of the plants under very various circumstances. Not less conflicting are the statements made by persons resident at Canton as to whether the same plant will produce either green or black teas. Abel was led to suppose that such could be the case, but that the "broad thin-leaved" plant is preferred for making the green tea; and this statement is corroborated by that of a Chinaman who had been eight times in the bohea country, remaining there from four to six months each time, and who stated that "bohea may be cured as hyson, and hyson as bohea." Mr. Reeves, who is well known to some distinguished botanists in England as having turned his attention in some degree to scientific objects, expresses his astonishment at the two teas ever having been confounded, and that the difference in colour between the two infusions is alone sufficient to do away with the supposition that they are the produce of the same plant, differing only in the mode of curing. Mr. Millett, who, in 1827, held a high official appointment in the Honourable Company's factory at Canton, is of a different opinion. He says, that there are two kinds of plants, of which one has a leaf of a much darker green than the other, and that this difference may be partly attributable to cultivation; "but it is to the various modes of preparation that the green and black teas (as they are called in England) of the shops are due." Mr. Reeves explains the contradiction of the various statements thus: "There is a species of tea grown in the province of Canton of a pale-coloured leaf (occasionally mixed with congou tea to make the tea imported under the name of bohea), and this tea can be coloured and made up to imitate various qualities of green tea, and large quantities are yearly thus made; but still it is only an appearance that can be given." Information of a similar nature as that of Millett is given in a decisive tone by Mr. Davis in his account of the Chinese. So that the balance is certainly in favour of the opinion adopted, perhaps rather too hastily, by the Tea Committee. Further proof may be inferred from the fact, that a system of artifical colouring appears to enter into the composition of all the green teas for exportation, and these again it is averred are never used by the Chinese. Although I have been obliged to leave the question unsettled, enough has been said to show that the inferiority of the Assam tea is not entirely owing to its being, as has been said, green tea prepared in the black method. The discovery of the tea within the British territories in India has excited more speculation among scientific men on the Continent than in England itself! M. Alphonse De Candolle, the distinguished son of a most distinguished father, has published an article on it in the Bibliothèque Universelle de Genève, for June 1835, and from this an extract has been made in the Annales des Sciences Naturelles for February 1836. M. A. De Candolle, judging from the fact that the Burmese make no use of any other tea for infusion but that which is imported overland by the Chinese, contenting themselves with eating the tea of part of their own frontiers manufactured into a pickle, concludes, that the Assamese tea will prove but of inferior quality, being the same with that which I have said the Burmese use as pickle. He says, "Thé sauvage pourrait bien donner une saveur plus forte, plus acre, et un parfum peu delicat. Cette consideration cependant rediminue pas, à nos yeux, l'interêt de la decouverte des Anglais. Si la province d'Assam, que touche à la Chine, presente la thé spontane, elle doit étre eminemment propre à la culture de cet arbuste. En supposant que la plante sauvage soit d'une faible ressource, la plante cultivée, celle surtout que l'on ferait venir de Chine, pourrait étre forte avantageuse."

Abel's Journey, p. 222.

Royle's Illust., p. 111.

Royle's Illust., p. 110.

Bot. Mag. (New Series), t. 3148.

Royle's Illust., p. 111.

Davis's Account, vol. 2, p. 351. 468.

For this, he gives Mr. Crawford as his authority.

Note.—The geographical part of this article is very incorrect, owing probably to the limited means of consultation on such a point in the possession of the author.

I now come to the consideration of the steps which in my opinion must be followed, if any degree of success is to be expected. Of these the most important is the importation of Chinese seeds of unexceptionable quality, and of small numbers of the finest sorts of tea plant. I imagine, and I think that most persons will agree with me, that the importation of even the inferior kinds would be more likely to lead to the produce of a marketable article than the cultivation of a wild, or (to use our Indian notions) a more expressive term, jungly stock. The evidence I have before adduced relative to the fact of seeds possessing or not possessing most of the properties of the parent, is, I trust, sufficient to show, that instead of orders being sent for the recall of Mr. Gordon, that gentleman should have been directed to redouble his exertions in procuring additional seeds and plants. The discovery of the tea plant in Assam I take to be important on two heads: 1st. The fact of its occurring, as to a considerable extent, denizen of certain portions of the wooded tracts, argues volumes in favour of those tracts being the best adapted for its cultivation. 2dly. From the fact that a wild stock is, under certain management, to which I shall have occasion hereafter to allude, reclaimable, to a greater or less extent. On both these grounds the most, indeed the only, philosophical course that remained, was to cultivate imprimis on the tracts alluded to, the best procurable plants, taking at the same time every precaution towards reclaiming the Assam plants. These same remarks apply to a considerable extent to the nurseries in other parts of British India, unless, indeed, the usual qualities of a jungle stock are expected to be reclaimable by the soils of the Himmalayan range. From what I have said, it will, I think, appear, that the prospect of immediate competition with China was quite visionary. The first step must be, therefore, the importation of seeds, with a small proportion of the best plants, from China; this is still more essential from the total annihilation of those previously imported, and the importation must continue to be for some years, for obvious reasons, an annual one. The seeds and plants are to be planted in the tea localities themselves, and, when these are stocked, in such other situations as may be deemed most eligible. If it be deemed advisable that the seeds should be sown in Calcutta, they are to be sown in goomlahs, and on no account are they to be transplanted. The living plants that are procured must be brought round and sent up in earthen pots; and the choppers of the boats must be so constructed as to admit of being removed whenever it may be deemed necessary. As I have said, the number of plants may be limited; their transmission will not involve a large outlay of money. It should be so managed that they shall arrive in Bengal at the commencement of the cold season. Having located a certain number of good Chinese stocks, and it is with this view alone that I recommend the importation of plants, owing to the greater certainty of success, experiments may be made in crossing, that is, by applying the fertilizing power of pollen of one to the stigmata or communicating organs of fecundation of another; and as according to the law, that the produce of such fecundation possesses the properties of the plants furnishing the pollen, it is obvious that the pollen of the Chinese plants must be applied to the stigmata of those of Assam. By repeating the experiments indefinitely, always applying good pollen from Chinese plants to the plants produced by previous crosses, it may be expected that the indigenous plants of Assam will lose most or all of those bad qualities that may with reason be supposed to exist in it. I need not enlarge further upon this subject, which is one of great extent, and the operation of which requires, in an especial degree, care; it is one, however, of every-day application in countries where horticulture is properly attended to. The only circumstance that can retard the improvement of the Assamese plants under such circumstances, is the existence of a deteriorating quality in the soil, and this there are no grounds for supposing to be the case; even if it be so, the necessity for the experiments is still further increased. There are other methods of improving, or rather reclaiming plants, on which, as they are obvious to everybody acquainted with horticulture, I need not dwell. I allude to grafting, &c. &c.

On the principle that improved culture improves the whole plant, it may be said that the importation of seeds from China is not necessary. But let me ask, which is the best as well as the safest plan? By adopting the one, success is certain, and moreover rapidly so; by adopting the other, its attainment is postponed to a remote, and perhaps to an indefinite period. The fact that wild stocks are more or less irreclaimable, leads me to state, that all the accounts I was enabled, through Mr. Bayfield, to gather, induce me to suppose, that the tea possesses the last bad quality in a considerable degree. All the Chinese, or rather Shan Chinese, agreed in saying, that the wild plant was not considered worthy of being submitted to cultivation; and I must not omit to mention, that the tea of the Pollong districts of Burma, situated to the N.E. of Ava, and which is said to be from the wild stock, has not hitherto, although cultivated to a certain degree from a remote period, undergone any improvement. The step next in importance is, to secure a sufficient number of first-rate Chinese cultivators and manufacturers, both of black and green teas. This can only be done by the usual route; for I found that among all the so-called Chinese, who are to be met with at Mogoung, Bamo, and Ava, as well as among those who form the large annual caravans that trade with Burma, there is not a single genuine Chinaman.

From the remarks I have made as to the importance of improving the Assamese plants, it will be evident that certain qualifications are necessary in the person who has the general superintendence of the whole plan. It has been generally allowed, that the superintendence of the culture of any given plant requires, at the least, a certain degree of practical knowledge, and that, if this be combined with some theoretical knowledge, the chances of success are much increased. Now it may be fairly asked, how are the above qualifications fulfilled in the instance of the present superintendent of tea, Mr. Bruce? The question may appear invidious, particularly to those unacquainted with Assam; but the answer is obvious; indeed, to do Mr. Bruce justice, I believe he does not pretend to possess either one or the other. As a zealous, hard-working person, Mr. Bruce cannot be well exceeded; and to these good qualities he adds those of a tolerable acquaintance with the natives of Upper Assam, and of the Assamese language, so far as colloquial intercourse with the lower orders, and the possession of strong physical powers.

The relative merits of the superintendents of tea culture in Java, and in Assam, require no comments. In the former country, we find the scheme superintended by a naturalist of repute, M. Diard, who has, no doubt, contributed largely to its success; in the latter, it is directed by a person who was bred up to a seafaring life, and whose long residence in Assam has been devoted entirely to mercantile pursuits, and the command of gun-boats.

To counteract the above want of two points, which, to speak plainly, appear to me to be of paramount importance, the only requisite condition is, particularly if the tea scheme be of partial extent, to append to the establishment a person well versed in the theory and practice of horticulture, as well as of arboriculture; without this be done, no experiments can be tried with any prospect of success. If none such are procurable in India, many are in England; neither would a larger salary than 300 rupees a month be required to secure the services of a person embodying all the necessary qualifications. He should be responsible for the treatment of the plants, while Mr. Bruce's responsibility should embrace all the other minor details. Relative to this point I may observe, that the idea of the extreme insalubrity of Upper Assam is totally unfounded, at least so far as Europeans are concerned, and has originated from persons of timid habits, in whose eyes blades of grass are death-bearing toorais.

There is another point on which considerable stress is to be laid, particularly when the extremely indolent habits of the natives of Upper Assam are taken into account. I allude to the necessity of some one residing in or as close to the scene of operations as possible, in order that the labourers may be duly kept to their work. Neither can I conceive what other view could be entertained, after the Government had sanctioned the application of Mr. Bruce for an assistant. Be this as it may, both superintendent and assistant reside at Sadiya, three days' march from Tingrei, the chief scene of operations. In this instance the plea of insalubrity cannot be urged: Rangagurrah has every indication of being healthy, and so have several places between that and Tingrei, a distance of about 10 miles. But with regard to insalubrity, no reference can be made to the superintendent, because his freedom from the liabilities of fever formed part of the grounds on which he was raised to his present situation. I may be here allowed to suggest, that the appointment of his assistants should not remain entirely with Mr. Bruce, as was the case in the first appointment. The last point I would beg to urge is, the placing of the scheme under Captain Jenkins, the head authority in Assam, who, in addition to his well-known zeal for the welfare of the province under his charge, adds a degree of general scientific knowledge which but few possess.

I cannot conclude this part of my report without adverting to the extremely desultory manner in which the question of tea culture in India has been treated by every author who has written on the subject, with the exception of Mr. M'Clelland. To what conclusion but one can we come, when we find an authority, who has been supposed to be acquainted with the question in all its detail, stating very gravely that a temperature between 30° and 80° is requisite; and when we find that this is as gravely taken up by a more popular and more philosophical author. True it is that neither had seen the tea in its native state when the statements were made, but equally true it is that neither can show a single datum in any of the authors who have noticed the tea as it exists in China, on which to found such a curious and rather broad statement. From such loose data, such indeed as are generally supposed to be inadmissible into questions of scientific import, it is, that a station between Mussori and Deyra Doon is stated to be particularly eligible.

Royle's Illust., p. 136.

The truth of Dr. Wallich's statement, "that a very slight acquaintance with the character of the countries where the attempts were made to introduce the cultivation of the tea plant, is sufficient to account for the total failure of them," has been amply proved by the unqualified success of the tea culture in Java; although indeed Dr. Wallich's opinion is strengthened by that of Mr. Royle, who says, that success could not be expected either in Java or Ceylon, the vegetation of both being tropical. I will admit that it is tropical, as indeed is the case in other tropical countries at or about the level of the sea, but I believe that mountains exist in both of the magnificent islands alluded to. I have the authority of Dr. Blume, one of the first living botanists, and of Professor Schouw, a very able writer on botanical geography, for making a contrary statement, to the purport, that the vegetation of the higher regions of Java (above 5,000 feet) is very much like that of the Himmalayas, and probably forms but one with it, that extra-tropical forms exist in lieu of tropical, as oak-woods, instead of fig-woods, &c. But not only do I object to the desultory style of argument, but to the actual contradictions that appear. How can we reconcile the statement, that the tea "appears to attain the greatest perfection in the mild climate about Nankin, with the selections of spots 5,000 to 7,000 feet above the level of the sea, in latitude 33° 19′."

Lind. Introduction to Botany, p. 513.

Royle's Illust., p. 127.

I trust that the spirit of these observations will be taken in the proper light; that they will not be viewed as originating in a spirit of scepticism; but in a strong wish to protect, so far as my abilities will allow, the interest of the Government which I have the honour to serve. That the tea plant may succeed in certain portions of the Himmalayas is probable enough, but I will not hazard any speculations on this point until I know the precise circumstances attending its successful culture in Java.

Royle's Illust., p. 124.

That it will not succeed for a very long period, unless tea seeds are imported, cannot, I think, be doubted. That the Himmalayas are not so well adapted as Assam for the cultivation, cannot likewise be doubted; for if "it cannot be a difficult task to transfer from one country to another a plant, which grows naturally and is cultivated extensively, to one which possesses so many of the plants which are common to the two," it will, I presume, be allowed to be a much less difficult task to do so, when, with the same similarity in the associated plants, we have the plant referred to itself occurring naturally and extensively. If these premises be correct, it follows that the culture of the tea plant should be restricted entirely to Assam.

The success of the scheme cannot depend upon fortuitous circumstances, but will do so on the rationality of the plans adopted. This observation, although a truism to a certain extent, is absolutely necessary. But even supposing that the most rational plans be carried into execution, some time will be necessary before the success of the scheme be complete. But what is a period of even 50 years, if at the end of that time really good teas can be exported from Assam! I say 50 years, not that I think it will require so long a period, for had good tea seeds been sent into Assam, as soon after the sittings of the Tea Committee as would have allowed the examination of the tracts, reported to produce tea, by competent persons, it is my firm conviction that good teas might have been manufactured within three years of the present date. As affairs stand now, the scheme must recommence *ab origine*, involving a loss of nearly three years, and of large sums of money; to say nothing of the revulsion that must have taken place in the minds of all interested in its prosecution. I have above stated my conviction, that success is, under the circumstances alluded to, certain; and I have adopted this conviction on the following grounds:

1st. That the tea plant is indigenous to, and distributed extensively over, large portions of Upper Assam.

2d. That there is a similarity in configuration between the valley of Assam, and two of the best-known tea provinces of China.

3d. That there is a similarity between the climates of the two countries, both with regard to temperature and humidity.

4th. That there is a precise similarity between the stations of the tea plant in Upper Assam, and its stations in those parts of the provinces of Keang-nan and Kiang-see that have been traversed by Europeans.

5th. That there is a similarity both in the associated and the general vegetation of both Assam and those parts of the Chinese tea provinces situated in or about the same latitudes. I have before more than once alluded to the success that has attended the cultivation of the tea plant in Java. I have but little hesitation in affirming, that Java does not present the necessary qualifications to such an extent as does Assam; yet success has been insured to an unexpected degree. This success appears to have been obtained by annual importations of excellent seed, and by great care in procuring the best possible cultivators. Of the degree of the success some idea may be formed by the fact, that a gentleman of great experience recognised in some Java tea, taken to Canton, the flavour of the original stock. It is said to have succeeded at Rio Janeiro, and in the western parts of North America; but in no place but in Java has it been carried to such an extent as to allow of its exportation.

EXTRACT INDIA REVENUE CONSULTATIONS, 25 September 1837.

(No. 82.)—From *W. H. Macnaghten*, Esq., Secretary to the Government of India, to *N. Wallich*, Esq., Secretary to the Tea Committee. No. 23.

Sir,

I AM directed by the Right honourable the Governor-general of India in Council to acknowledge the receipt of your letter of the 5th instant, with its enclosure, forwarding Mr. Griffith's report on the tea plant of Upper Assam, together with a sample of the Assam souchong tea.

2. His Lordship in Council concurs with you in opinion, that Mr. Griffith is entitled to the approbation of the Government for the zeal and ability which he has manifested on this occasion.

3. The original papers which accompanied your letter are herewith returned, copies having been kept for record.

I am, &c.
(signed) *W. H. Macnaghten*,
Secretary to the Government of India.

Council Chamber,
25 September 1837.

EXTRACT INDIA REVENUE CONSULTATIONS, 30 October 1837.

From Captain *Francis Jenkins*, Agent to the Governor-general North-East Frontier, to *N. Wallich*, Esq., M. D., Secretary to the Tea Committee, Fort William; dated the 5th October 1837. No. 27.

Sir,

I HAVE the honour to forward, for submission to the Tea Committee, the result of Mr. Bruce's experience on the manufacture of black tea, as at present conducted by the Chinese labourers imported by the Government, together with some information collected by Mr. Bruce from them of the treatment of the plant in that part of the country from which these Chinamen have come, and observations on the growth of the indigenous plant in the Sudya district. Pol. Depart. Miscellaneous.

2. This memoir by Mr. Bruce appears to me very creditable to him, as it shows the attention he has been paying to the charge with which he has been entrusted, and I think it might beneficially be made public through the medium of the Agricultural Society's transactions. Mr. Bruce has here given all the information on the manufacture of black tea that is obtainable by him, and it may probably not be without use to those who are attempting to manufacture

tea elsewhere; but it is to be hoped that it may draw forth the information of others of our countrymen who may have had more opportunities of observing or ascertaining the growth and culture of the tea plant in different provinces, soils, and aspects; and learning the practice of manufacturing tea, either in China or Java, by natives of more than one province of the former country, and confined not only to the preparation of black, but embracing also the preparation of green and other teas.

3. We are now very devoid of information on all subjects regarding the tea plant, and any contributions which would afford us the means of comparing the relative value of our tea plants and soils, their culture, and the manufacture of tea, could not but prove valuable.

4. In looking over Mr. Bruce's observations, I have been struck with the confirmation of the correctness of Mr. Bruce's views in clearing away the high jungle, exposing the tea plants to the sun, and cutting them down nearly to the surface of the ground. These measures appear to have been justified by the information of the Chinamen, and by subsequent experience from the growth of the plants; although, if I recollect rightly, they were entirely condemned by Mr. Griffith.

5. The Sketch Map annexed will serve to show the number of tea tracts already discovered; and there is a certainty that we are far from yet knowing the extent to which this invaluable plant is spread over that part of Upper Assam. Looking at the abundance of the indigenous plant, the great facility with which it can be propagated, and the wide extent of the appropriate soils and situations for the tea plant which we command round Sudya, I think I may be allowed to conclude, that nothing now remains to be ascertained to establish the expediency of carrying on the experimental plantations, than to have the opinions of experienced persons on the quality of the tea. When the black tea of last year's preparation, which I directed to be sent down, reaches Calcutta, the Committee will have the means of obtaining some judgment on the value of the article as a black tea, although great allowances should be made for the disadvantages under which the tea has been prepared, packed, and preserved. It still, from the unfortunate delay in procuring green-tea manufacturers from China, remains to be known what sort of an article may be turned out from the Assam plant as green tea; notwithstanding, however, that we know so little of the quality of the manufactured tea, I feel convinced myself that a good, wholesome, and marketable article has already been proved to be the successful result of the experimental plantations, and that enough is known to warrant the Government to make a far greater outlay than has yet been ventured on, in taking measures for extending the plantations, and providing a numerous colony of labourers.

6. I have called upon Mr. Bruce to endeavour to give some idea of the quality of tea he could probably manufacture with his present command of labourers, and I shall have occasion to address the Committee again when his reply is received. I imagine that he could make about 200 or 300 chests in the year, and if he can make this quantity or more, without raising the pay of his labourers exorbitantly, he ought, I conceive, to be authorized to do so; for the larger the quantity made, the less will be the proportionate charge of superintendence, and the more likelihood there will be of engaging great capitalists to embark in the speculation, from the knowledge that the means of employing their money is not limited to a confined tract, or a mere experimental plantation.

I have, &c.
(signed) *Francis Jenkins*,
Agent to the Governor-General.

Governor-General's
Agent's-Office, N. E. Frontier,
5 October 1837.

(True copy.)
(signed) *N. Wallich*, M.D.
Secretary to the Tea Committee.

An Account of the Manufacture of the Black Tea, as now practised at Sudeya, in Upper Assam, by the Chinamen sent thither for that purpose; with some Observations on the Culture of the Plant in China, and its growth in Assam.

By *C. A. Bruce,* Superintendent of Tea Culture.

The method of making Black Tea.

In the first place, the youngest and most tender leaves are gathered; but when there are many hands, and a great quantity of leaves to be collected, the people employed nip off, with the forefinger and thumb, the fine end of the branch with about four leaves on, and sometimes even more, if they look tender. These are all brought to the place where they are to be converted into tea; they are then put into a large, circular, open-worked bamboo basket, having a rim all round two fingers broad (*see* fig. 1). The leaves are thinly Plate IX. scattered in these baskets, and then placed in a framework of bamboo, in all appearance like the side of an Indian hut, without grass, resting on posts, two feet from the ground, with an angle of about 25° (fig. 2). The baskets with leaves are put in this frame to dry in the sun, and are pushed up and down by a long bamboo, with a circular piece of wood at the end (fig. 3). The leaves are permitted to dry about two hours, being occasionally turned; but the time required for this process depends on the heat of the sun. When they begin to have a slightly withered appearance, they are taken down and brought into the house, where they are placed on a frame (fig. 4) to cool for half an hour. They are then put into smaller baskets, of the same kind as the former, and placed on a stand (fig. 5). People are now employed to soften the leaves still more, by gently clapping them between their hands, with their fingers and thumb extended, and tossing them up and letting them fall, for about five or ten minutes. They are then again put on the frame (fig. 4) during half an hour, and brought down and clapped with the hands as before. This is done three successive times, until the leaves become to the touch like soft leather; the beating and putting away being said to give the tea the black colour and bitter flavour. After this the tea is put into hot cast-iron pans (fig. 6), which are fixed in a circular mud fire-place, so that the flame cannot ascend round the pan to incommode the operator. This pan is well heated, by a straw or bamboo fire, to a certain degree. About two pounds of the leaves are then put into each hot pan, and spread in such a manner that all the leaves may get the same degree of heat. They are every now and then briskly turned with the naked hand, to prevent a leaf from being burnt; when the leaves become inconveniently hot to the hand, they are quickly taken out and given to another man, with a close-worked bamboo basket (fig. 7) ready to receive them. A few Plate X. leaves that may have been left behind are smartly brushed out with a bamboo broom: all this time a brisk fire is kept up under the pan. After the pan has been used in this manner three or four times, a bucket of cold water is thrown in, and a soft brickbat and bamboo broom used, to give it a good scouring out; the water is thrown out of the pan by the brush on one side, the pan itself being never taken off. The leaves, all hot, on the bamboo basket, are laid on a table that has a narrow rim on its back, to prevent these baskets from slipping off when pushed against it. The two pounds of hot leaves are now divided into two or three parcels, and distributed to as many men, who stand up to the table with the leaves right before them, and each placing his legs close together; the leaves are next collected into a ball, which he gently grasps in his left hand, with the thumb extended, the fingers close together, and the hand resting on the little finger. The right hand must be extended in the same manner as the left, but with the palm turned downwards, resting on the top of the tea leaves. Both hands are now employed to roll and propel the ball along; the left hand pushing it on, and allowing it to revolve as it moves; the right hand also pushes it forward, resting on it with some force, and keeping it down to express the juice which the leaves contain. The art lies here in giving the ball a circular motion, and permitting it to turn under and in the hand two or three whole revolutions, before the arms are extended to their full length, and drawing the ball of leaves quickly back without leaving a leaf behind, being rolled for about five minutes in this way (fig. 8). The ball of tea leaves is Plate X. from time to time gently and delicately opened with the fingers, lifted as high

as the face, and then allowed to fall again. This is done two or three times, to separate the leaves; and afterwards the basket with the leaves is lifted up as often, and receives a circular shake to bring these towards the centre. The leaves are now taken back to the hot pans, and spread out in them as before, being again turned with the naked hand, and when hot taken out and rolled;
Plate X. after which they are put into the drying basket (fig. 9), and spread on a sieve, which is in the centre of the basket, and the whole placed over a charcoal fire. The fire is very nicely regulated; there must not be the least smoke, and the charcoal should be well picked.

When the fire is lighted, it is fanned until it gets a fine red glare, and the smoke is all gone off; being every now and then stirred, and the coals brought into the centre, so as to leave the outer edge low. When the leaves are put into the drying basket, they are gently separated by lifting them up with the fingers of both hands extended far apart, and allowing them to fall down again: they are placed three or four inches deep on the sieve, leaving a passage in the centre for the hot air to pass. Before it is put over the fire, the drying basket receives a smart slap with both hands, in the act of lifting it up, which is done to shake down any leaves that might otherwise drop through the sieve, or to prevent them from falling into the fire and occasioning a smoke, which would affect and spoil the tea. This slap on the basket is invariably applied throughout the stages of the tea manufacture. There is always a large basket underneath to receive the small leaves that fall, which are afterwards collected, dried, and added to the other tea; in no case are the baskets or sieves permitted to touch or remain on the ground, but always laid on a receiver with
Plate X. three legs (fig. 11). After the leaves have been half dried in the drying basket, and while they are still soft, they are taken off the fire and put into
Plate IX. large open-worked baskets (fig. 1), and then put on the shelf (fig. 4), in order that the tea may improve in colour.

Next day the leaves are all sorted into large, middling, and small; sometimes there are four sorts. All these, the Chinese informed me, become so many different kinds of teas; the smallest leaves they called Pha-ho, and the second Pow-chong, the third Su-chong, and the fourth, or the largest leaves, Tay-chong. After this assortment, they are again put in the sieve in the drying basket (taking great care not to mix the sorts) and on the fire, as on the preceding day; but now very little more than will cover the bottom of the sieve is put in at one time, the same care of the fire is taken as before, and the same precaution of tapping the drying basket every now and then. The tea is taken off the fire with the nicest care, for fear of any particle of the tea falling into
Plate X. it. Whenever the drying basket is taken off, it is put on the receiver (fig. 11), the sieve in the drying basket taken out, the tea turned over, the sieve replaced, the tap given, and the basket placed again over the fire. As the tea becomes crisp, it is taken out and thrown into a large receiving basket, until all the quantity on hand has become alike dried and crisp; from which basket it is again removed into the drying basket, but now in much larger quantities. It is then piled up eight and ten inches high on the sieve in the drying basket; in the centre a small passage is left for the hot air to ascend; the fire, that was before bright and clear, has now ashes thrown on it to deaden its effect, and the shakings that have been collected are put on the top of all; the tap is given, and the basket with the greatest care is put over the fire. Another basket is placed over the whole, to throw back any heat that may ascend.
Plate X. Now and then it is taken off, and put on fig. 11; the hands, with the fingers wide apart, are run down the sides of the basket to the sieve, and the tea gently turned over; the passage in the centre again made, &c., and the basket again placed on the fire. It is from time to time examined, and when the leaves have become so crisp that they break with the slightest pressure of the fingers, it is taken off, when the tea is ready. All the different kinds of leaves underwent the same operation. The tea is now, little by little, put into boxes, and first pressed down with the hands and then with the feet (clean stockings having been previously put on).

There is a small room inside of the tea house, seven cubits square and five high, having bamboos laid across on the top to support a network of bamboo, and the sides of the room smeared with mud to exclude the air. When there is wet weather, and the leaves cannot be dried in the sun, they are laid out on the top of this room on the network, on an iron pan, the same as is used to heat the leaves; some fire is put into it, either of grass or bamboo, so that the flame may ascend high; the pan is put on a square wooden frame (fig. 12) that has wooden rollers on its legs, and pushed round and round this little room by one man, while another feeds the fire, the leaves on the top being occasionally turned; when they are a little withered, the fire is taken away, and the leaves brought down and manufactured into tea, in the same manner as if it had been dried in the sun. But this is not a good plan, and never had recourse to if it can possibly be avoided.

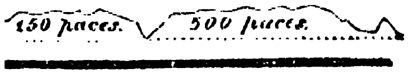
A Dialogue between Mr. *C. A. Bruce* and the China Black-Tea Makers.

"Does the China tea plant grow mostly on the mountains of China, or in the valleys?—About seven parts grow on the mountains, and three in the valleys. Does the tea plant grow amongst the snow?—Yes. Does not the snow kill or hurt the plants?—It hurts them very little; it may kill some of the old trees, but often new shoots come up from the old plants. To what age does the tea plant attain in your country?—Generally, about 50 years; but some only live 10. How do you plant the tea seeds?—I dig a hole, about four fingers deep and eight inches in diameter, and put as many as I can hold in both hands into it, then cover it up. How long is it before the seedlings come up, and in what months do you put them into the ground?—We sow some in November and December, and some in January; when the rains set in they come up. When are the plants fit for plucking?—Sometimes in the third and sometimes in the fourth year, according to the soil. How high are they in the third year?—From one to two cubits; a great deal depends on the soil. If you were not to pluck the leaves, would the plants grow higher?—To be sure they would; it is the constant plucking of the leaves that keeps the plants low. How many of the seeds that you sow come up in general?—If good seed, from 10 to 20. Do you allow them all to grow in the same place, or do you transplant them afterwards?—We allow them all to grow, and very seldom transplant; if we do, it is performed in the rains, and from four to six plants are put close together, so as to form a fine bush. At what distance is one tea bush from another?—From three to four feet apart, on small ridges of earth, eight inches to a foot high, a hollow space being left between to draw off the rain water; the bushes are at equal distances from each other, and in straight lines. Do you ever dig trenches, to prevent the plants being washed away?—Yes, we are obliged to dig many, the shape and form of the trenches depend upon the ground and situation. What quantity of manufactured tea do you think each tea plant produces in one season?—This varies very much; some plants only produce two rupees' weight, while others produce a pound and a half; but about a quarter of a pound all round, I should think, the first crop; the second crop a little less, and some people never take the third crop, for fear of killing the trees. Do you always manufacture the tea in China, in the same way as you have the Assam tea?—The same. Do you know how to make green tea?—No. Do you ever put anything to the tea to give it a flavour?—Never. Do you ever sow or plant in the shade, or have you any trees to shade the plants?—No; there are a few large trees here and there, but not for shade. If your plantations are on the side of mountains, they cannot have the sun all day?—True; in some plantations the plants are in the shade for nearly half the day: some China merchants, that come to purchase tea, pretend to know which is shady and which sunny by the smell, the sunny being preferred. Do the tea plants cast all their leaves in the winter?—Great numbers fall, but the plants always retain some. Which do you think have the most juice when they are rolled, the leaves from the sunny tract, or those from the shady?—Those from the shady tract. Which require to be most dried in the sun?—The shady-tract leaves. Which of the two teas do you think best?—That from the sunny tract. Which produce most leaves, those in the shade, or those plants that have been cut down, and afterwards permitted to grow up?—The latter twice as many. Which do you think produce most seeds?—Those in the sun. Do you ever, in China, plant from slips?—No. After you have made the tea in China, how long is it before it is fit to drink?—About one year: if drank before that, it will taste unpleasantly and of the fire, and will affect the head. How long will tea keep without being damaged?—If well-secured from the air in boxes, it will keep good for three or four years. In which months do you commence plucking the leaves in China?—If the weather is warm and fine, and the season has not been a very cold one, the first crop commences in May, the second crop about 47 days after the first, and the third crop about the same time after the second, or 42 days. When you roll the China leaves, do you think they contain more juice, or less, than the Assam ones?—The China leaves, I think, have more juice, and the leaves are much smaller. Is the soil of the China tea the same as the Assam?—The same. How often do you weed your plantations?—Once in the rains, and once in the cold weather."

The place these Chinamen speak of is called "Kong-see," on the mountains, about 40 days' journey by water to Canton, and two days' journey from the great tea country "Mow-ee-san."

A few Observations on the Tea Plant of Assam.

The tea plants in Assam have in general been found to grow, and to thrive best, near small rivers and pools of water, and in those places where, after heavy falls of rain, large quantities of water have accumulated, and in their struggle to get free have cut out for themselves numerous small channels. The sort of land to which I allude will be, perhaps, better explained by means of a diagram:



The dotted line shows the limit of the highest flooding. On the top of this land you must fancy a thick wood of all sorts and sizes of trees, and amongst these the tea tree, struggling for existence; the ground here and there having a natural ditch cut by the rain water, which forms so many small islands. The largest piece of ground that I have met with, I think was about 600 paces without a break. I also add a section of the little river Kahong, where the tea plant abounds, exhibiting many small islands, every one of which is covered with trees of various sizes, and the tea among them; the land being never wholly inundated in the rains, though nearly so. This kind of land is called Coorkah Mutty. I have never met with the tea plants growing in the sun, but invariably under shade, in thick woods, or what we call tree jungle, and only there, and in no other jungle whatever. It struggles for existence amongst so many other trees that it becomes tall and slender, with most of its branches high up. The largest tea tree I ever met with was 29 cubits high, and four spans round: very few, I should say, attain that size. I have taken great numbers of tea plants from the jungles, brought them four to eight days' journey to my own house, and planted them in the sun, that is, without any shade. During the first six months the half of them died; at the end of the year about one quarter of what I had originally brought only lived; at the end of the second year, there was still less; those that did live threw out leaves and blossoms, but the fruit never came to perfection. The plants I speak of were from one to three feet high; if they have grown anything since they were transplanted, it has hardly been perceptible, either in height or thickness; many of them have had the advantage of a little shade from the trees in my garden, and those that had the most shade, I find, look healthier than those that had none, and they throw out more leaves. I have often read and heard of the China tea plant growing no higher than three feet; their being planted in the sun, and their leaves constantly gathered, I think accounts for it. A short time ago I requested, and got permission from Government, to try some experiments in my own way. About the middle of last March I brought 3,000 or 4,000 young plants from their native soil, in the Muttuck country, about eight days' journey, and planted them in the tree jungles of this place, eight and ten close together, in deep shade. From 400 to 500 were planted in different places, some miles from each other. In the latter end of May I visited them, and found them as fresh as if they had been in their native soil, throwing out fresh leaves. As these thrived so well, last June I brought from the same place 17,000 more young plants, and planted them in Coorkah Mutty, about two miles from this place, in deep shade; they are now throwing out new leaves, and

Plate VIII.

and thriving as well as could be expected, although the soil here is nothing like that from whence they were taken, in which point alone the places differ. To show how very hardy they are, I may mention, that they were in the first instance plucked out by the roots by the village people who were sent to bring them from their native jungles, put upright into baskets, without any earth, brought two days' journey on men's backs, put upright into canoes, a little common earth only being thrown amongst their roots, and were from seven to twenty days before they reached me; and then they had to be carried half a day's journey to the intended new plantation, and were four or five days with only a little moist earth at their roots, before they were finally put into the ground; and yet these plants are doing well, at least the greater part of them. I will give another instance of their hardiness. Last year the Government sent a deputation of three scientific gentlemen to examine the Assam tea plant, Dr. Wallich, Mr. Griffith, and Mr. M'Clelland; the two former botanists, the latter a geologist. Dr. Wallich, who conducted the deputation, requested me to accompany them, being the only European who had ever visited the tea tracts, as the different localities are called. One day after having seen some tea, in company with these gentlemen, and as we were returning, I was informed, by some natives, of another patch or tract of tea that had been cut down. We went and examined it, and found the plants just coming up, about six inches high. On inquiry, we were told that the villagers took the tea plant to be so much jungle, and therefore nearly cut all of it down close to the ground, and set fire to the whole, and then planted paddy or rice on the spot. The crop of paddy had just been cut and brought in. When we saw the plants, the shoots were coming up from the roots and old stumps, thick and numerous. Some tea plants I noticed had only been cut a foot, and some two to four feet, from the ground; all these threw out numerous shoots and leaves, an inch or two below where they had been cut. I afterwards converted this piece of ground into a tea garden, on account of Government, and now it is one of the finest I have. Where there was formerly one tea plant, there are now upwards of a dozen; the new shoots from the old cuttings forming a fine bush, and showing a great contrast to some of the original trees, which I have permitted to stand, with slender trunks, and a few branches only at the top. This tract or garden has yielded more tea this season than twelve times the same space of ground in the jungles would have done. I found that as the plants that had been cut down grew up again, the leaves acquired a yellowish tinge, from their exposure to the sun, and were much thicker than those in the jungles; but this yellow tinge has worn off, and the leaves are now as green as those in the shade. As this tract answered so well by being cut down, and set fire to, I tried the same experiment upon another tract close by, and it has come up to what I expected of it, eight to twelve new shoots having risen from the old stumps in the place of one. It is now a very fine tea tract. Not knowing how this plan of cutting down might answer eventually, and how it might affect the plants, I took another tract in hand, allowed all the tea plants to remain, but cut down all the other trees, large and small, that gave them shade, piled them up, and what I could not set fire to, I threw into the water-courses. These tea plants are doing well; but still each plant remains single, consequently has not many leaves, and is much in the same condition as when under shade. We have not had sufficient time to show what effect the sun may have on the leaves, and the tea made from them. This tract has a curious appearance, the plants appearing hardly strong enough to support themselves now they are deprived of their friendly shade. I have some other tracts under experiment; some where I have permitted the jungle trees to grow, and only cleared away the brushwood and other small trees, to admit the rays of the sun; others with very little shade. I have cut off branches of the tea plants, and laid them horizontally in the ground, with an inch or two of earth on them, and they have thrown out numerous shoots the whole length of the branch; other branches were simply pushed into the earth, and they have grown; but this was all in the shade: I do not think they would answer so well in the sun.

I have the pleasure of furnishing a Map which I have made of all the tea tracts I have discovered; since it was composed, several more tracts have been discovered, which I have not had time to enter. It should be observed, that south from Suddeeah to the Debree river is generally termed Chyquah; south of Debree river is called the Muttuck country, as far as the Burro Dehing river; Plate XI.

river; south of the Burro Dehing river is situated Rajah Purundah Sing's country. From the hill and river called Jourah Poong, which is nearly at the source of the Debree river, to a place called Beesa, south of the above hill, on the Burro Dehing river, near the little river Juglow Pauney, is called the Singpho country, being all to the east of the above line. Now it will be perceived, that not a single tea tract has been discovered north of the Debree river, and that they are all on the south side of it. The Muttuck country, which I have traversed most, appears to me to be one vast tea country; and I feel confident that not one half of its tea tracts have been yet discovered. The whole of the soil of the Muttuck country appears well adapted for tea. I have taken particular notice of it, digging and examining it at every place where I have stopped. Great numbers of the tea tracts have been cut down, in sheer ignorance, by the natives, and converted into paddy fields. I know of three tracts where the paddy had been collected, and the tea plants had sprung up again; when these are neglected, they all rise up into thick wood jungle. Several of these places have been pointed out to me by some of the old inhabitants. Almost every inhabitant of the Muttuck country knows now the tea leaf, seeing how much we prize it, and getting little rewards from me when they bring in a branch from any new tract. There is plenty of tea in Rajah Purundah's country, but he is too lazy to trouble himself about it; he is not even acquainted with those places laid down in my map. I have lately heard of a very extensive tract in his country, said to be as large as a dozen tracts put together. Several tracts are 800 paces long, and nearly the same in breadth, and others only 100; but they have not all been properly examined, and may prove much larger. All these tracts can be enlarged almost to any extent, from the numerous seedlings that are found amongst the tea plants, from the great number of seeds that can be collected every year, and from the immense number of cuttings that may be planted. With respect to the seedlings, I have sown numerous seeds at Suddeeah, in the sun; many have come up, and appeared to thrive very well for the first year; but there was an insect, the mole cricket I think it is called, which used to nip off the young and tender leaves, and carry them into a hole under ground near the root of the plant; and I never succeeded in getting one plant to live. But last year I sowed some seeds in my garden under the shade of trees and bushes; they have come up, and are thriving very well. The seeds I sowed in the sun last year in the Muttuck country, and in their native soil, in one of my tea tracts, have also come up and are doing well. The tea tracts in the Singpho country are much larger than those in the Muttuck. The Singphos have known and drank the tea for many years, but they make it in a very different way from what the Chinese do. They pluck the young and tender leaves, and dry them a little in the sun; some put them out into the dew, and then again into the sun, three successive days; others only after a little drying put them into hot pans, turn them about until quite hot, and then place them into the hollow of a bamboo, and drive the whole down with a stick, holding and turning the bamboo over the fire all the time until it is full, then tie the end up with leaves, and hang the bamboo up in some smoky place in the hut; thus prepared, the tea will keep good for years. A good way further east, they dig holes in the earth, line the sides with large leaves, boil the tea leaves, throw away the decoction, put the leaves into the hole, which they cover over with leaves and earth, and then allow the whole to ferment; after which it is taken out, filled into bamboos, and in this manner prepared, taken to market. These Singphos pretend to be great judges of tea. All their country abounds with the plant, but they are very jealous, and will give no information where it is to be found, like the Muttuck people. All the Singpho territories are over-run with wood jungle, and if only the underwood was cleared, they would make a noble tea country. The soil is well adapted for the plant. Nearly three years ago, I by accident left a few Singpho tea plants, which I had carried away, on the banks of the New Dehing, three days' journey from the place where I had got them; they were discovered by some Singpho friends of mine, and stuck into the earth; and there they are now growing, as if they had never been transplanted, and notwithstanding they were put into the shade. The Singpho country is a fine one, but as long as that nation can get the tea leaves from the jungles, they never will cultivate the plant. The country is thinly inhabited by a set of men who are always fighting amongst themselves. The tea is said to grow on the top of the Nagah hills, marked in my map south of Ningrew, on the banks of the Burro Dehing. All the tea tracts laid down are in the valleys.

The above observations have been thrown together in a hurry, without much order. I therefore hope that allowances will be made for their imperfections. I may at some other time resume the subject, if it is thought of any interest.

(signed) *C. A. Bruce*,
Superintendent of Tea Culture in Assam.

Extract India Revenue Consultations, 30 October 1837.

(No. 97.)—From *R. D. Mangles*, Esq., Officiating Secretary to the Government of India, to the Tea Committee, dated 30 October 1837. No. 30.

Gentlemen,

I am directed by the Honourable the President in Council to acknowledge the receipt of your Secretary's letter, dated the 16th instant, with its enclosures, and to inform you, in reply, that his Honor considers Mr. Bruce's "Account of the manufacture of the black tea, as now practised at Sudiya by the Chinamen sent up for that purpose, with some observations on the culture of the plant in China, and its growth in Assam," to be an interesting and valuable paper, and highly creditable to the zeal and intelligence of the gentleman by whom it has been drawn up. You are requested to communicate to Mr. Bruce the acknowledgments of the President in Council.

2. His Honor has directed 500 copies of the paper to be printed, both for transmission to the Honourable the Court of Directors, and for the information of the public in this country and in England.

I have, &c.

(signed) *R. D. Mangles*.
Officiating Secretary to the Government of India.

Council Chambers, 30 October 1837.

Extract India Revenue Consultations, 9 April 1838.

From the Tea Committee, to *R. D. Mangles*, Esq., Officiating Secretary to Government of India; 20 March 1838. No. 13.

Sir,

We have the honour to report, for the information of the Honourable the President in Council, that there are at present in readiness, at our office, for transmission to the Honourable the Court of Directors, a large supply of samples of Assam tea, consisting of 12 large boxes of paho and souchong, assorted as follows:—

Paho, 1st quality - - - - - - - - - - -	1 box.
Ditto, 2d ditto - - - - - - - - - - -	1 —
Ditto, 3d ditto - - - - - - - - - - -	1 —
Souchong, 1st quality - - - - - - - - - -	4 —
Ditto - 2d ditto - - - - - - - - - -	4 —
Ditto - 3d ditto - - - - - - - - - -	1 —
	12

2. Each box contains on an average 19 seers, or 38 lbs. of tea, carefully packed in a leaden canister made by the manufacturers lately arrived from Canton, and marked as above, both in Chinese and English. The boxes are severally covered with the proper sort of matting, secured by slips of rattan, and addressed to the Honourable Court in the usual manner.

3. The consignment from which these samples were taken arrived in Calcutta on the last day of January. Owing to a deficiency in the original packing, and the great degree of dampness to which the boxes had been exposed during the passage from Assam, a considerable proportion of the tea was either wholly[*]

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[*] Amounting to what would have filled about five boxes more.

spoiled, or so much deteriorated, that no process, we believe, could have restored it to anything like a fair quality. We have therefore rejected all that portion as unfit to be sent home, at least with the present supply; deeming it a matter of primary importance that the value of the first samples transmitted to Europe should not be diminished by anything that might add to the many disadvantages under which they must necessarily arrive at a destination where they will in all probability have to be subjected to the severe test of examination by the first tea inspectors in London.

4. We beg most particularly to urge on the consideration of his Honor in Council, that not only the plants from which the leaves were gathered, still in their original wild and uncultivated state, but the details of the various processes employed in preparing and transmitting the tea, must obviously have laboured under the many and serious difficulties and obstacles of a first attempt, but which it may reasonably be expected will be diminished, and progressively be overcome, as further trials are made. Besides which, it ought to be borne in mind, that, strange as it may appear, it is by no means settled whether it is not actually the green sort that has been prepared in the fashion of black tea; a point which can only be satisfactorily determined when the green tea manufacturers are set at work in Assam.

5. The tea in question arrived here under the designations of paho and souchong. In assorting each of these into three qualities, as noted in paragraph 1, our Secretary has been guided partly by the opinion of the Chinese assistants now here, and partly by his own discrimination of the difference in the flavour and appearance of the teas after they had undergone preparation for being repacked. Likewise, and in the first instance, by the various degrees of preservation in which he received the cargo from Assam, the process of preparation alluded to above consisted in gradually drying the tea over a nicely regulated coal-fire covered with ashes, in baskets made on purpose by the Chinamen, having the form of two inverted cones, with their ends truncated, and having an open sieve in the centre, as described and figured in Mr. Bruce's memoir on the manufacture of tea in Upper Assam, p. 110, fig. 9, 10. This precautionary measure our Secretary deemed absolutely necessary to prevent mouldiness, and consequent damage to the tea during the sea voyage.

Vide Plate X.

6. Our Secretary has been at pains to learn that it has always been customary in China to bestow great attention in preventing consignments of tea from being shipped on board vessels that have cargoes consisting of articles of strong savour, and which are known to be injurious to the delicate and fugacious aroma of tea, whether by their odour, or heating properties, or the like; and that it is usual even to plank off the space allotted for the chests. We accordingly solicit that such orders may be issued in regard to the shipment of the 12 boxes, as may be deemed best calculated to prevent any accident from happening to their contents from any of those sources. In case it should be deemed expedient to entrust the despatch to our Secretary's care, we are persuaded he will use the best diligence and care to procure freight in an early ship at the lowest rate possible, and under such engagements as will prevent any chance of injury during the voyage.

7. We beg leave to forward the accompanying small muster of the first quality of paho, and a large canister of the second quality of the same sort, regretting that we have none left of the souchongs, every leaf of it having been consumed in filling up the boxes.

8. We cannot close this letter without expressing our obligation to our Secretary for the skill and exceeding trouble he has taken to secure for this despatch of tea, on its arrival with the Honourable Court, every possible chance of its being found in a perfect and unimpaired condition, and that to him will be due whatever commendation may be considered ought to attach to the success of this novel and difficult undertaking.

We have, &c.

(signed) *J. Pattle.*
J. W. Grant.
R. D. Mangles.
C. K. Robison.
Ram Comul Sen.
Rajah Radhacant Bahadoor.

Calcutta, 20 March 1838.

EXTRACT INDIA REVENUE CONSULTATIONS, 9 April 1838.

(No. 25.)—From *R. D. Mangles*, Esq., Officiating Secretary to the Government of India, to the Tea Committee; dated 9 April 1838. No. 20.

Revenue Department.

Gentlemen,

I AM directed by the Honourable the President in Council to acknowledge the receipt of your letter of the 20th ultimo, and in reply to state, that his Honor in Council approves the measures that have been taken to preserve and pack the tea of Assamese production, which it is proposed to forward to the Honourable the Court of Directors, and that he has noticed with much satisfaction the testimony borne by the Committee to the zealous and valuable services rendered by Dr. Wallich on this occasion.

2. His Honor in Council approves your suggestion, that the engaging of freight for the tea should be left to your Secretary. He is authorized to take measures accordingly, and he will send the shipping documents to this department for despatch to the Honourable Court.

I have, &c.

Council Chamber,
9 April 1838.

(signed) *R. D. Mangles*,
Officiating Secretary to the Government
of India.

From *N. Wallich*, Esq., M. D., Secretary to the Tea Committee, to *R. D. Mangles*, Esq., Officiating Secretary to Government of India, Revenue Department; dated 29 March 1838. No. 21.

Sir,

I AM directed by the Tea Committee to report, for the information of the Honourable the President of India in Council, that the artificers, who were authorized to be procured from China in Mr. Secretary Macnaghten's letter, No. 96, dated 14th November 1836, arrived in the Futte Salam on the 1st February, and have resided in this garden ever since. The party consists of two green-tea manufacturers, two box-makers, and one canister-maker.

2. In the Committee's letter of the 20th instant, the Government were informed that the above five Chinamen had been of much service in the preparation and packing of the 12 chests of tea at present ready for despatch home. But it is desirable now that these men should be forthwith sent to Upper Assam, and I am directed to solicit, that his Honor in Council will please to sanction the necessary expenses for a boat and a trustworthy peon, for the occasion.

3. It appears from a counterpart of the agreement originally made with the Chinamen, that each received on the 23d November last an advance of six months' wages, at the rate of 15 dollars per month. On the other hand, it is evident from the repeated assurances of the men, that they took the said advance in the belief, that they would not reach their final destination in much less than six months, during which period they would be at no expense whatever, it being expressly stipulated in the agreement, that the men were to have free passage, food, &c. on shipboard. They accordingly left the whole amount of their advances with their families at Canton, and did not even provide themselves with a sufficiency of clothes. Under these circumstances, it was necessary to allow them a small monthly sum of six rupees for each man, by way of subsistence money, instead of insisting on any deduction from their regular wages (when these should become due); and the Committee was the more anxious to grant them this indulgence, as they expressed themselves a good deal disheartened on learning that two of their countrymen, who were sent up to Assam in 1836, had died; and, as the total amount of this extra expense, including five pieces of cloth to be made into dresses, will not exceed 200 rupees.

4. The present being a favourable opportunity for sending another Chinese interpreter in lieu of the man who died in Assam in July last year, as intimated in the Committee's letter to you under date the 15th November, I am directed to solicit the sanction of Government for engaging a properly-qualified person, at a salary not exceeding 100 rupees a month, which was the rate allowed the late interpreter. A respectable person of this description, besides being indispensably necessary in Assam, may, with propriety, be sent in charge of the newly-arrived Chinamen, whereby the expenses for an overseer will on this occasion be superseded.

5. The Committee further request permission to purchase a quantity of tin and lead, in the proportion of one-fourth of the former, and three-fourths of the latter, sufficient for making 200 or 300 canisters. About 20 maunds of lead, at eight rupees per maund, and five maunds of tin, at 25 rupees per maund, may be sent with the canister-maker. The men will also require a few tools, which may be easily procured, and will not exceed 20 or 30 rupees.

6. In conclusion, I am directed to submit the enclosed bill for expenses incurred in making a number of tea-boxes and canisters, amounting to Company's rupees 61. 10. 3. Twelve of these boxes and canisters are filled with tea; one round canister was forwarded to you with the Committee's letter, dated the 20th instant, and five large boxes and canisters are ready at this office for future use.

I have, &c.

Tea Committee's Office, Hon. Com.
Botanic Garden, 29 March 1838.

(signed) *N. Wallich*, M. D.,
Secretary.

The Honourable Company, Debtor.

No 22. To Expenses incurred in making 17 large boxes with canister, and four separate round canisters for holding samples of tea.

1 maund and 33 seers of lead for the canisters - - - Rupees	15	15	9
24 seers of tin for ditto - - - - - - - - - - -	16	9	6
43 planks for the boxes - - - - - - - - - - -	15	9	9
250 one-inch nails - - - - - - - - - - - -	–	5	–
12 coarse seetul patty for covering the boxes - - - - - -	4	11	–
Charcoal for melting lead, &c., and for drying the tea - - - -	4	–	–
	57	3	–
Sundry petty charges for rosin, flour, mustard, oil, chalk, &c. - -	4	7	3
Company's Rupees			

Received payment.

Tea Committee's Office,
Hon. Company's Botanic Garden,
30 March 1838.

(signed) *N. Wallich*, M. D.,
Secretary.

(signed) *J. Pattle*,
Chairman of the Tea Committee.

To C. Trower, Esq., Civil Auditor.

EXTRACT INDIA REVENUE CONSULTATIONS, 21 May 1838.

From *N. Wallich*, Esq., M. D., Secretary to the Tea Committee, to *R. D. Mangles*, Esq., Officiating Secretary to the Government of India, Revenue Department; dated 17 May 1838.

Sir,

I AM directed by the Tea Committee to state, for the information of the Honourable the President of India in Council, that in obedience to the instructions contained in paragraph 2, of your letter No. 25 of the 12th ultimo, the Assam tea, to which it relates, has been embarked on board The Calcutta, Captain [illegible]tley, and placed in a cabin between decks; and to enclose the bill of lading for the same, in triplicate, from which it will be observed, that the rate of freight is 7*l.* 10*s.* per ton, of 50 cubic feet; the whole amount being 9*l.* 19*s.* 9*d.* payable on delivery.

2. As it was ascertained, that for some years past the cargo of all homeward-bound ships has consisted, at least in part, of ox-hides, it became necessary to take additional measures, besides those described in my letter of the 20th March, with the view to the preservation of the tea, each box has accordingly been placed in a soldered tin case, and all 12 put, by pairs, in six strong wooden chests, for the better stowage of the consignment. The chests are marked "Assam Tea," and addressed to the Honourable Court of Directors of the East India Company; and each of them measures in—

Length, 2 feet 11 inches.
Width, 2 feet 1 inch.
Depth, 1 foot 9 inches

I have, &c.

(signed) *N. Wallich,* M. D.,
Secretary.

Tea Committee's Office,
Hon. Company's Botanic Garden,
17 May 1838.

(True Extracts.)

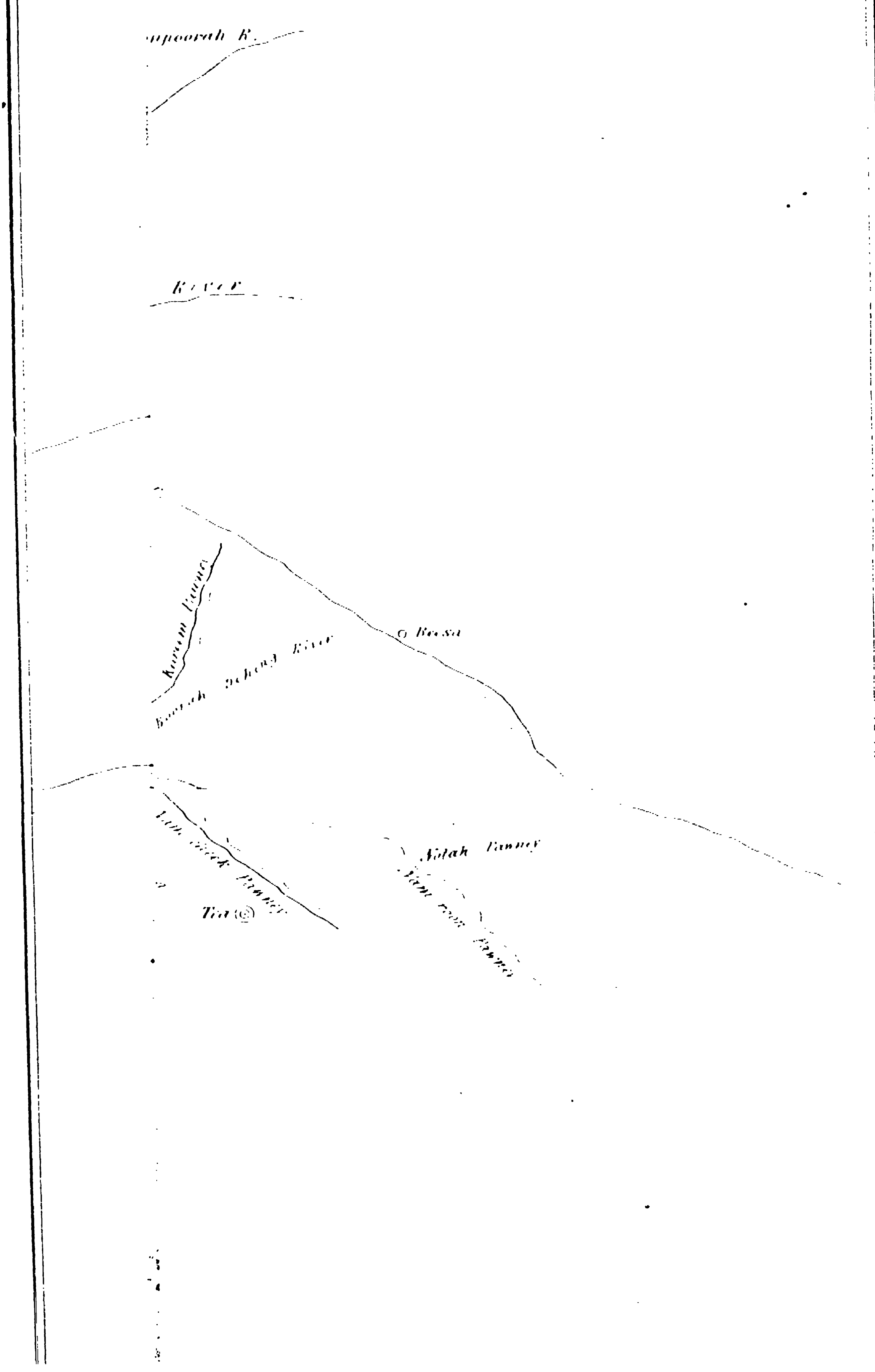
T. L. Peacock,
Examiner of India Correspondence.

East India House.
22 Feb. 1839.

SKETCH

Accompanying Letter to Mr. Macnaghten.

Dated 15 Aug^t 1836.



EXPLANATION OF PLATE VI.

The drawings of the flower, &c., are from Assamese dried specimens; of the fruit, and from Chinese specimens.

Camellia Theifera.

1.—Very young flower-bud.

2.—Bud more advanced.

3.—Flower.

4.—Flower, viewed posteriorly.

5.—Corolla removed, viewed posteriorly.

6.—Petal, with portion of the stamens cohering with its base and with each other.

7.—Petal, stamina removed, viewed as a transparent object, showing the venation.

8.—Anther, and portion of filament, viewed exteriorly.

9.—Anther, viewed interiorly, connection slightly dilated, in order to show the insertion or attachments of the filament.

10.—Ovarium, style, and stigmata; two sepals removed.

10*a*.—Apex of a division of the style, showing the structure of the stigma.

11.—Ovarium, transverse section.

12.—Ovarium, one of the cells laid open to show the situation, &c., of the ovula.

13.—Longitudinal bi-section of the ovarium, wall of one cell incomplete, showing the different directions of the ovula and their foramina.

Letters *a* and *b*, not marked in the plate in the original.

14.—Longitudinal section of the ovulum: *a*, testa; *b*, nucleus entire.

15.—Fruit, viewed posteriorly.

16.—Fruit, viewed anteriorly, seeds in their situation; in one cell two have been developed.

17.—Fruit, seeds removed, showing its loculicidal mode of dehiscence, and the axis remaining in situ.

18.—Seed.

19.—Internal view of testa, showing the ramification of the chalaza.

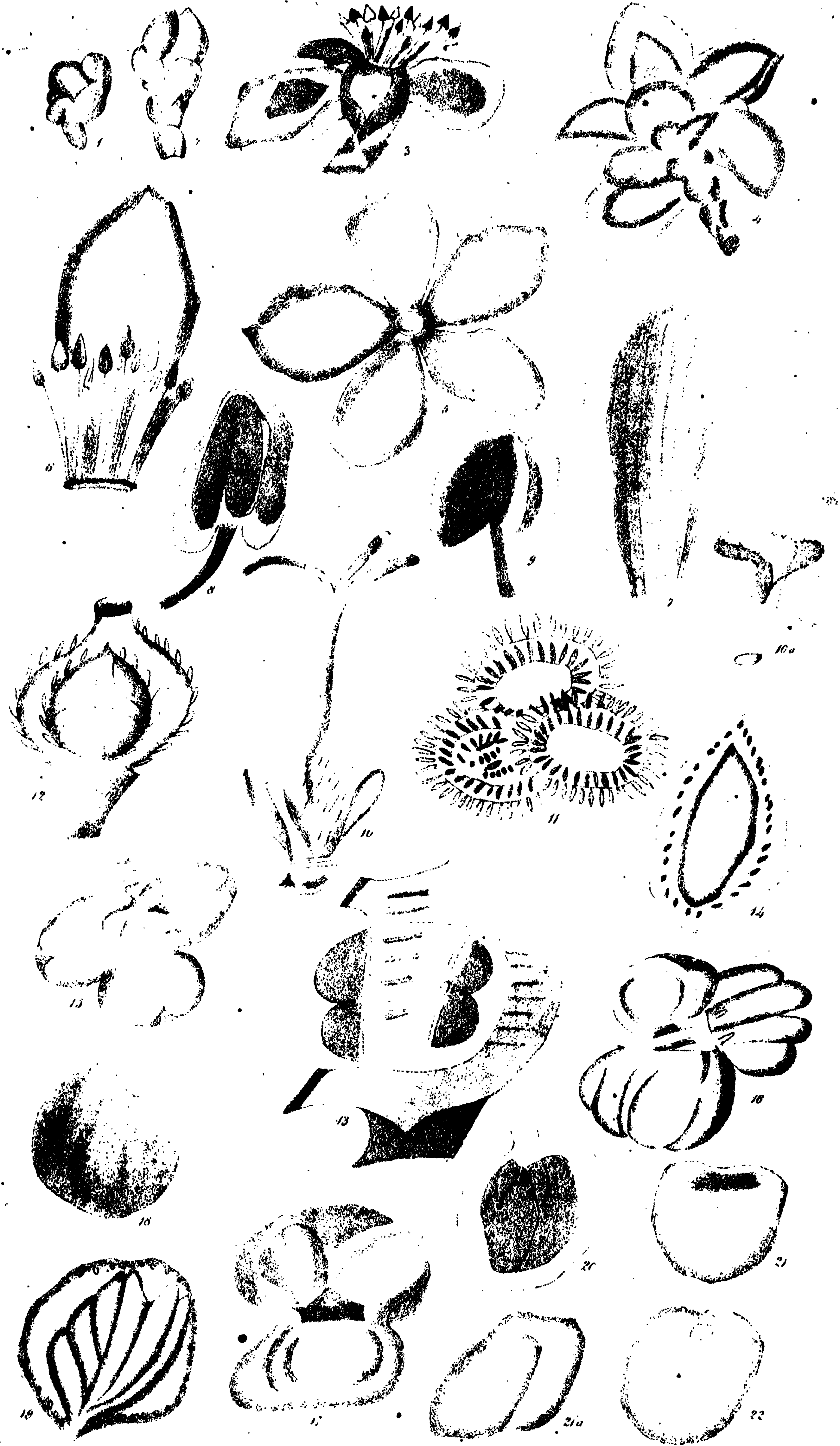
20.—Section of seed, showing the situation of the embryo.

21.—Embryo, viewed parallel to the greater diameter of the cotyledons.

21*a*.—Embryo, viewed parallel to the smaller diameter of the cotyledons.

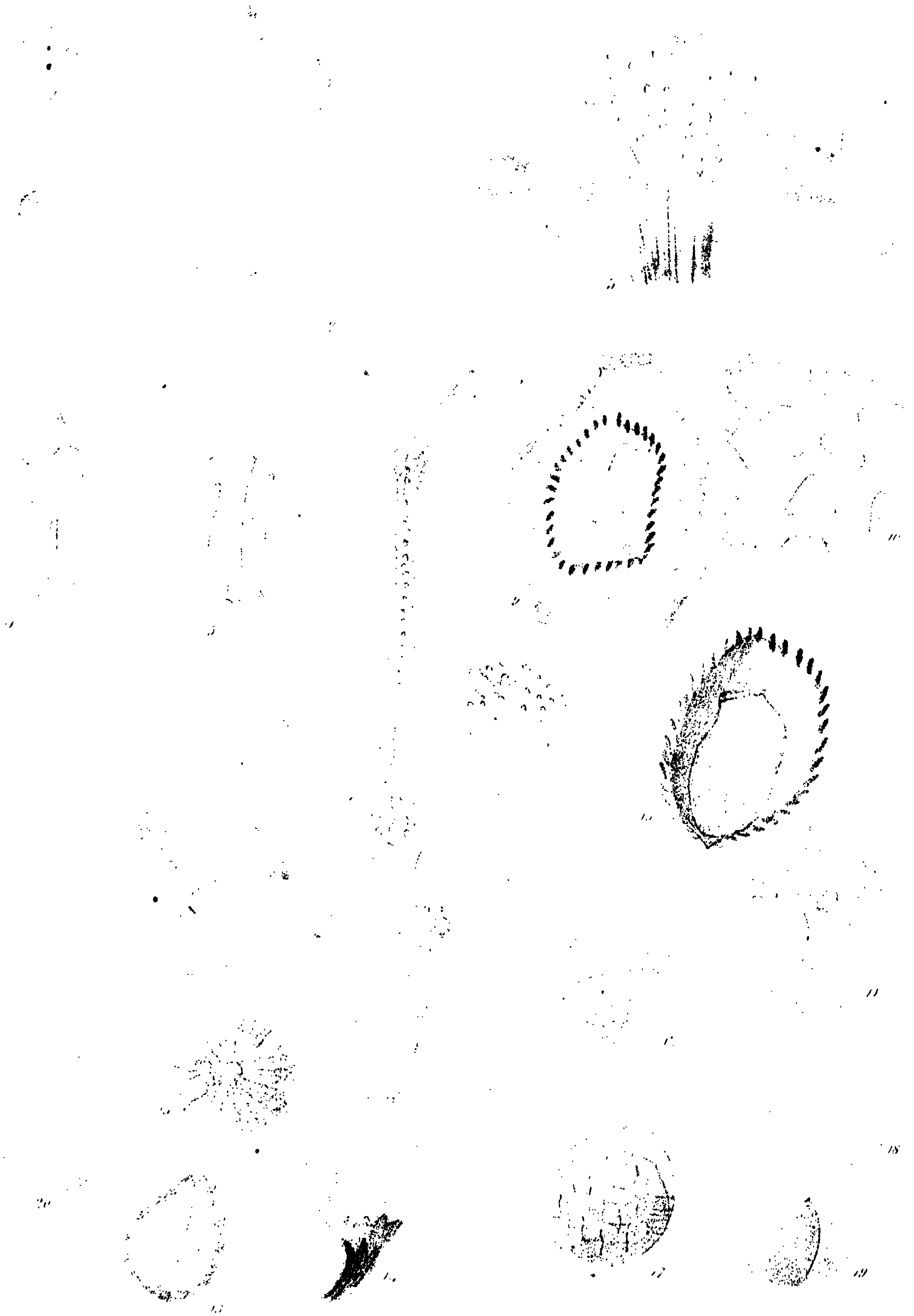
22.—Cotyledon, radicle, and plumula.

The drawing of the green-tea plant in the Botanical Magazine (New Series), t. 3148, represents the stamina erroneously, particularly as regards the attachment of the filaments. The mistake concerning the ovula, two of which are said to exist in each cell, has originated from a transverse section having been alone employed in ascertaining its structure.



Camellia theifera: Griff.

Plate A.



Camellia Caudata: Wall

Plate B.

Camellia Sp

EXPLANATION OF PLATE VII.

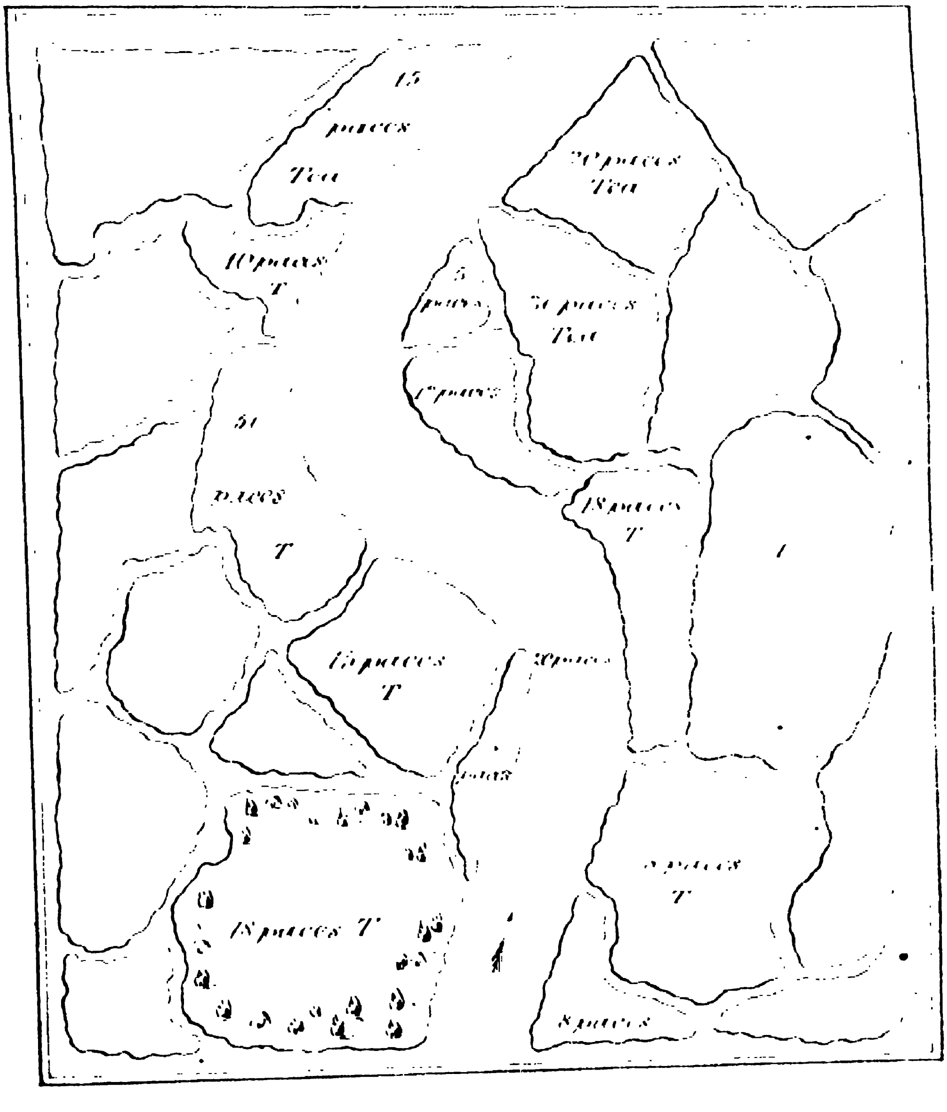
PLATE A.—*Camellia Candata.*—WALL.

1.—Flower-bud.
2.—Flower.
3.—Corolla and stamina ; corolla laid open.
4.—Stamen, outer view.
5.—Anther and apex of filament, inner view.
6·—Pollen.
7.—Pistillum.
8.—Division of style, with its stigma.
9.—One cell of the ovarium laid open, showing the number and situation of the ovula.
10.—Ovarium, transverse section.
11.—Portion of placenta, with two ovula, showing their different directions.
12.—Ovulum.
13.—Ovulum, longitudinal section through the testa.
14.—Capsule.
15.—Seed viewed on its upper surface, showing the pilum and mycropyle.
16.—Seed, longitudinal section through the testa.
17.—Seed removed, showing the archnoid appearance presented by the vessels of the testa.
18.—Embryo, parallel to the cotyledons.
19.—Ditto - parallel to the smaller diameter of the cotyledons.
20.—Ditto - one of the cotyledons removed.

PLATE B.—*Camelliæ,* Sp. from the Khasiya Hills ; *an Camellia Oleifolia?*—WALL.

1.—Capsule, while moistened.
2.—Capsule, dry.
3.—Seed.
4, 5.—Embryo.
6.—Embryo, cotyledon removed.

Section of the Kahong River, shewing the different channels the water had cut out for itself. The river is dry in the cold season, its banks are steep; all the little Islands are covered with Tea plants under shelter of the other trees, they are of various sizes, from 5 paces to 200, but near the bed of the river itself they are rather small. This kind of land is called Coorkah Mutty.



EXPLANATION OF PLATE IX.

Fig. 1.—Dallah, or large bamboo basket, for drying the tea leaves in, with a rim all round, 2½ feet in diameter.

Fig. 2.—Bamboo frame supporting the baskets with fresh-gathered leaves drying in the sun; some of the baskets are represented as placed on the frame.

Fig. 3.—Bamboo, with a circular piece of wood at the end, used for pushing up and bringing down the dallahs or baskets with leaves; the circular wood taking hold of the rim.

Fig. 4.—Frame, having three or more shelves made of bamboos placed lengthways, for holding the dallahs with leaves, after they have been removed from the sun.

Fig. 5.—Stand on which the basket is placed, 2 feet 8 inches wide, and 2 feet 6 inches high.

Fig. 6.—Cast-iron pan, placed on a mud fire-place, for heating the leaves; 2 feet 1 inch in diameter, and 7½ inches deep.

EXPLANATION OF PLATE X.

Fig. 7.—Close-worked basket, 2 feet 4 inches in diameter, with an edge all round, used for receiving the leaves from the pan, and for rolling them on, after it has been placed on the table.

Fig. 8.—The left hand grasping the leaves about to be rolled, resting on the little finger; the extended right hand with the fingers close together, except the thumb, which is stretched out, ready to be placed on the leaves received from the left hand.

Fig. 9 & 10.—Drying basket, lined with paper, on purpose to retain the heat better, and placed over a charcoal fire.

Fig. 11.—Stand for a large circular basket, for receiving the shakings from the drying-basket when placed on it, to remove the sieve, and to turn the leaves during the process of drying.

Fig. 12.—Stand with four legs, each having a wooden roller, 2 feet 8 inches high, and 1 foot 6 inches broad on each side.

Fig. 12*b*.—Represents this stand with the cast-iron pan on it.

Fig. 13.—Basket used for various purposes, such as shaking and cleaning the leaves, carrying the dry tea, &c.

Fig. 14.—The large circular basket Fig. 7, on the stand Fig. 11, having on it the drying-basket, with the sieve fixed to the middle by means of small bamboo pegs.

Tab 1

Fig. 1.

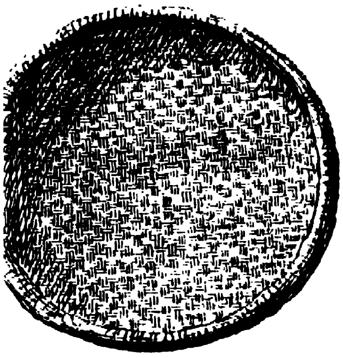


Fig 2.

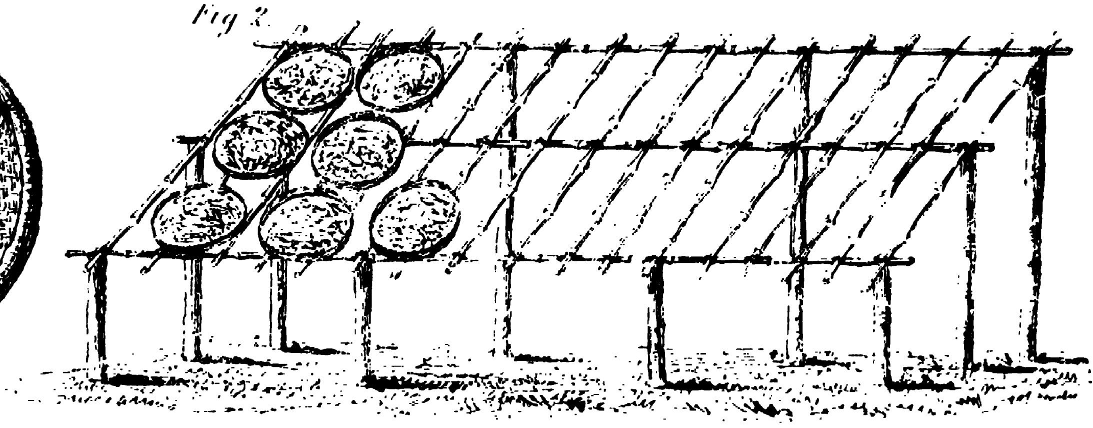


Fig 3

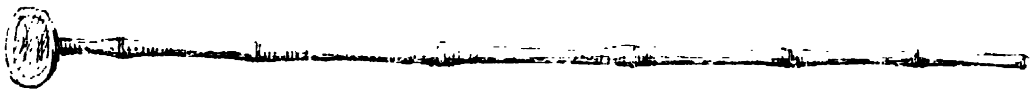


Fig 4

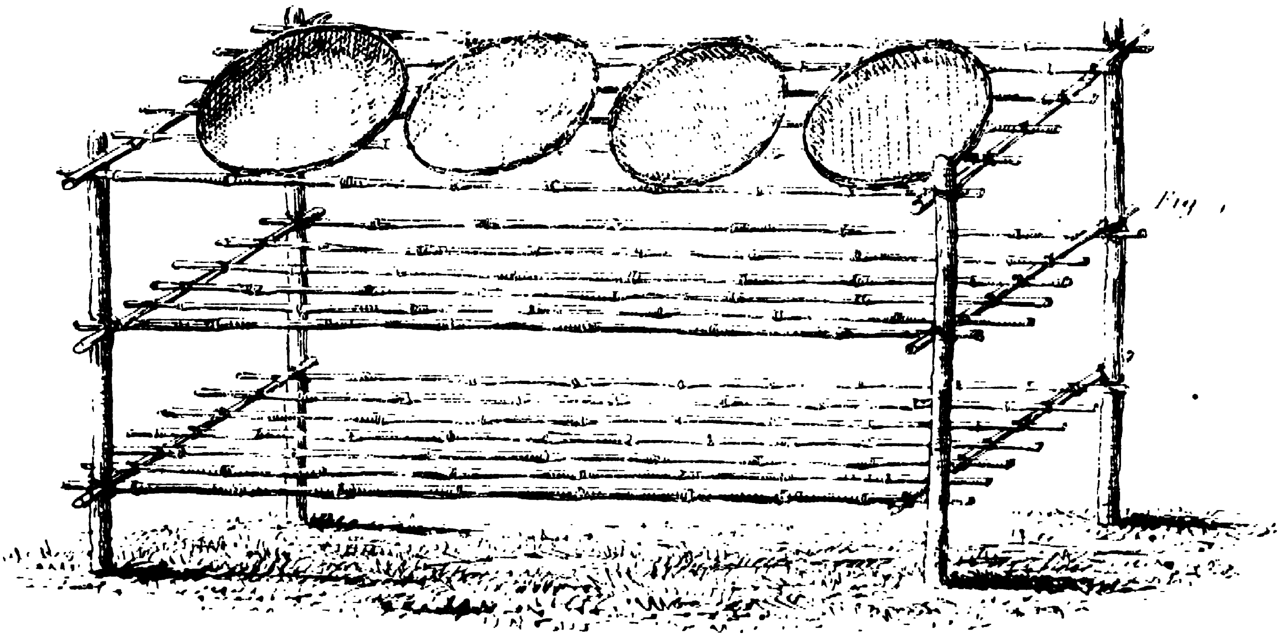


Fig 5

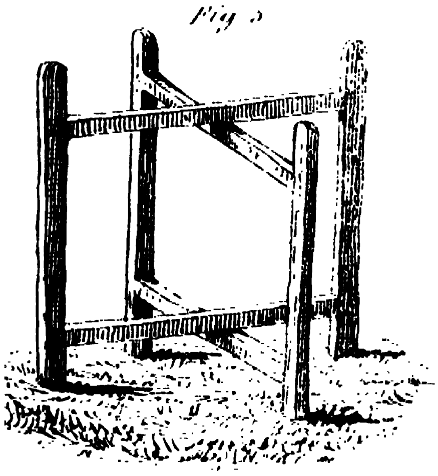
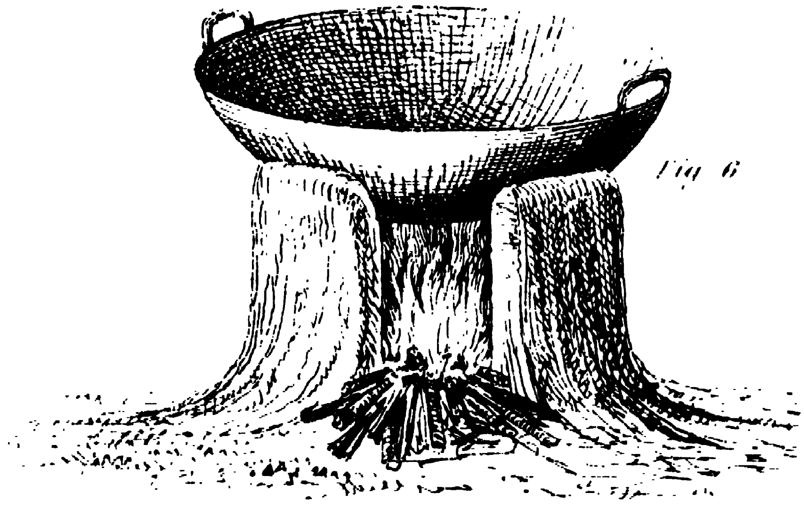


Fig 6



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Tab 2

Fig 7

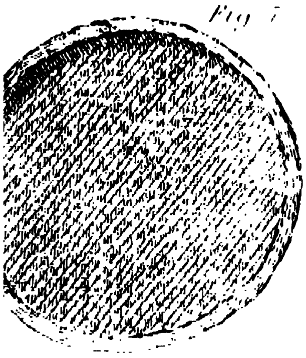


Fig 8

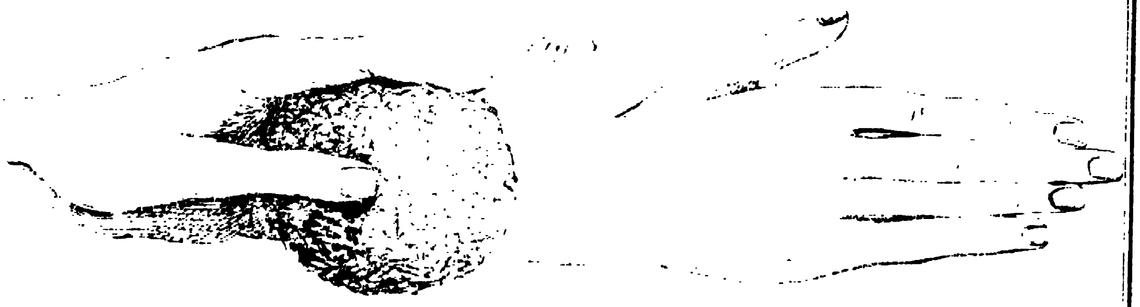


Fig 9 & 10

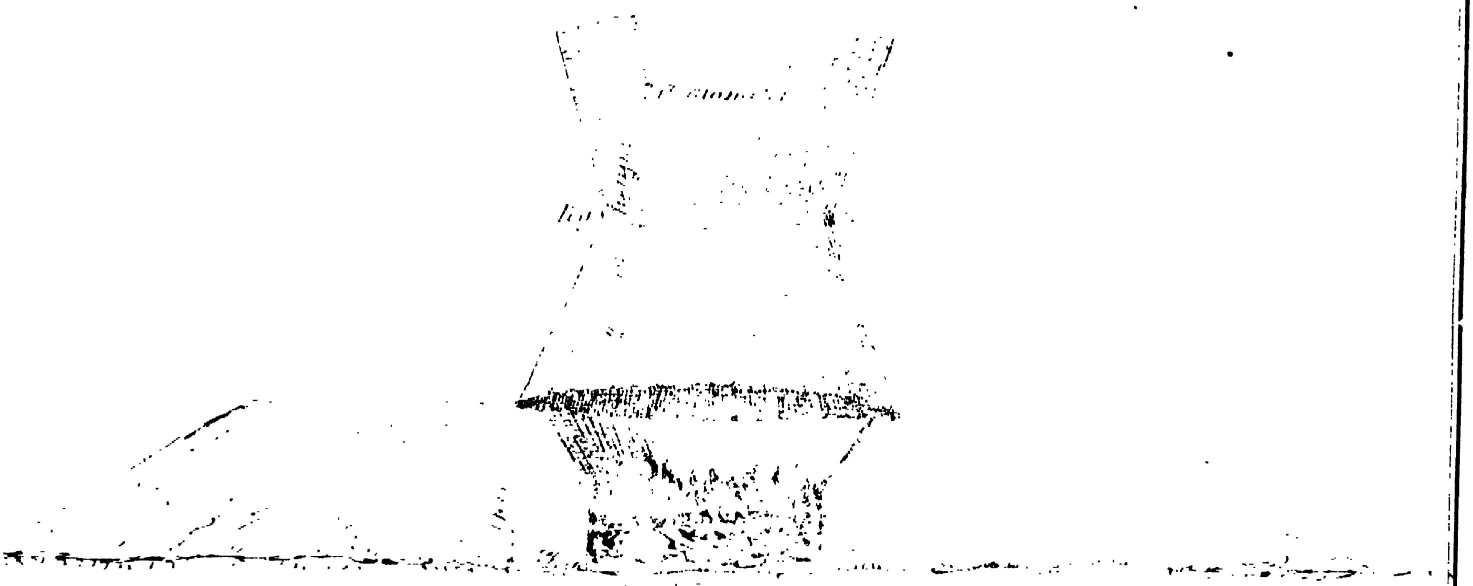


Fig 13

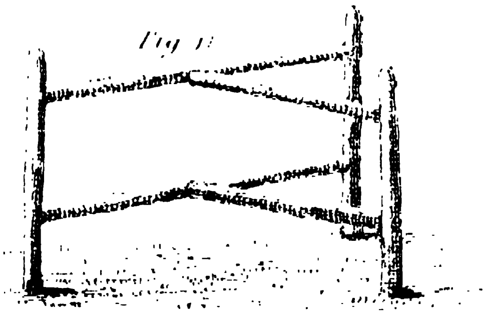


Fig 14

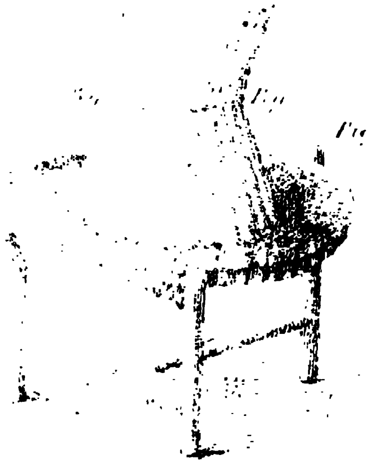


Fig 16

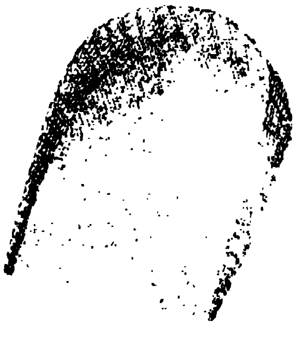
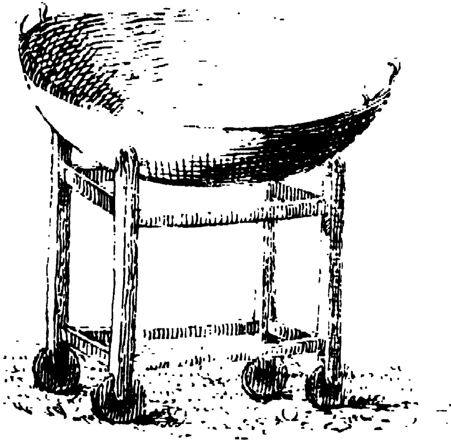
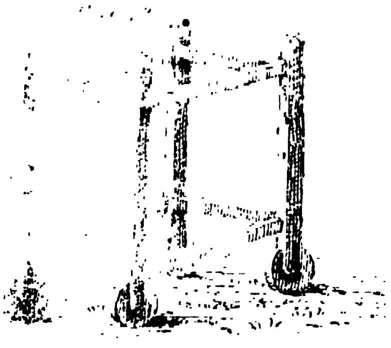


Fig 12





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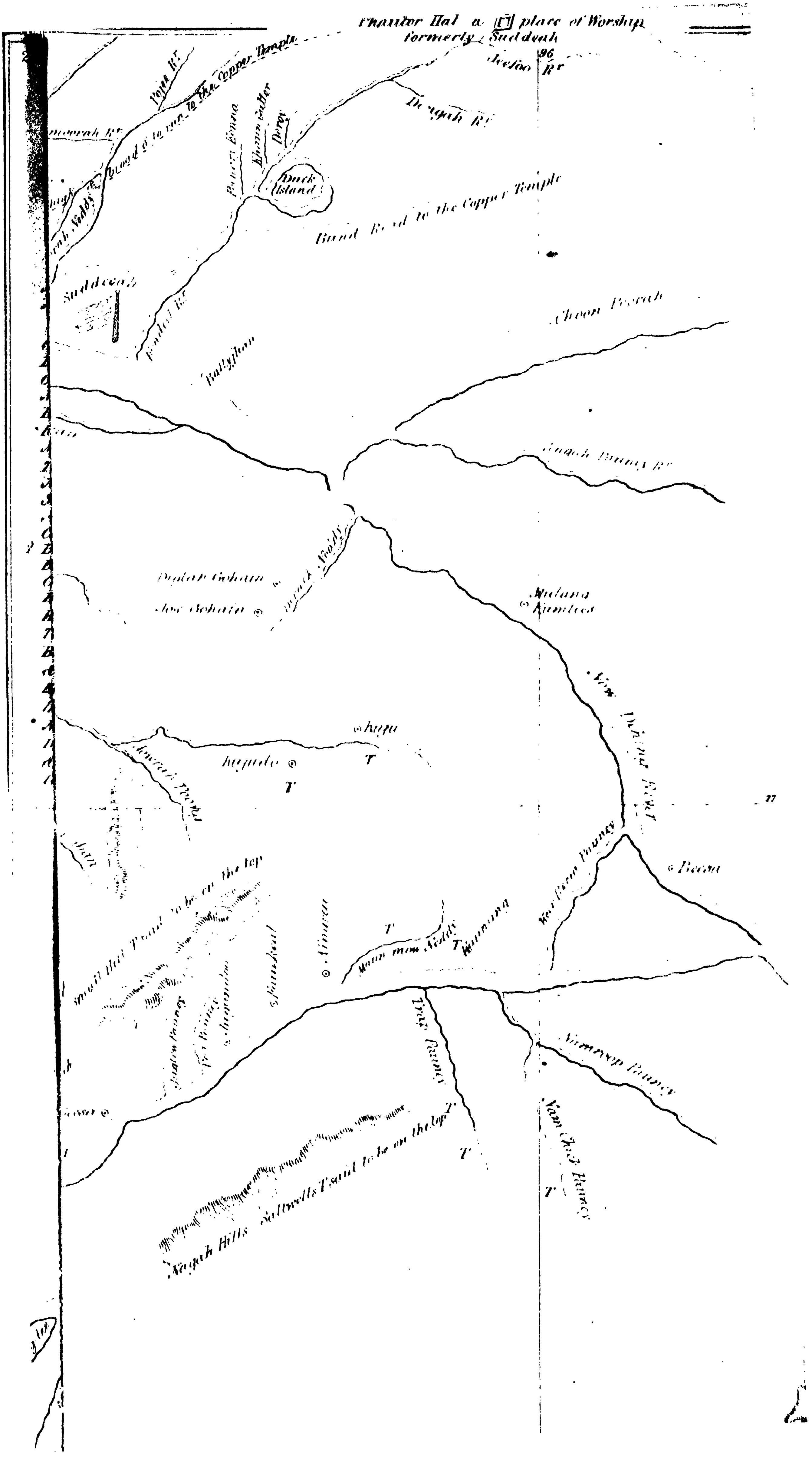
J. Basire, lithog

Luke G. & Hansard Printers


Thanior Hal a [T] place of Worship
formerly Suddeah
96
Jeeloo Rr
Road to the Copper Temple
Poga Rr
Dergah Rr
Deroy
Khamn Gutter
Duck Island
Bund Road to the Copper Temple
Suddeeah
Ballyphan
Choon Poorah
Dulah Gohain
Joe Gohain
Mulana
Kumlees
Rajugedo
T
27
Beesa
Nimroop Pauney
Naan Chok Pauney
Naam mun Niddy
Noa Dihing River
Tree Pauney
Nagah Hills Saltwells T said to be on the top
small Hill T said to be on the top